

Figure 1

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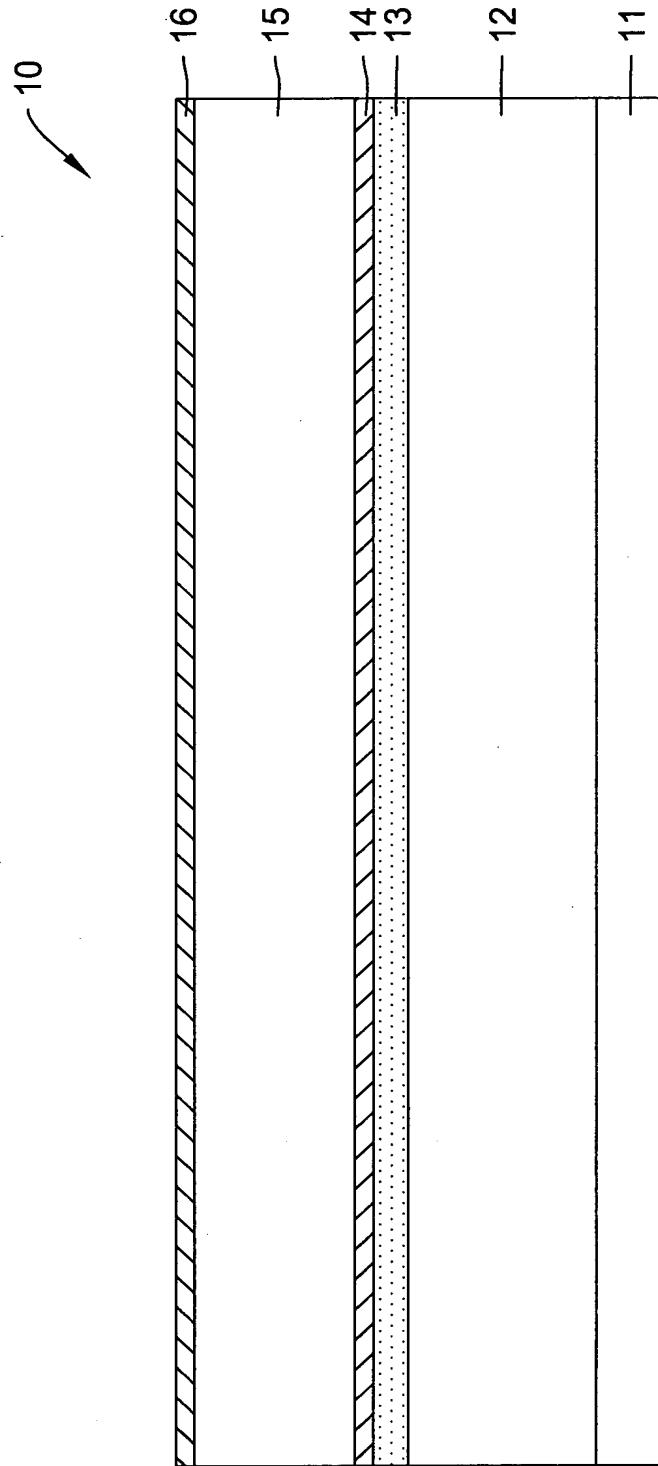


Figure 2

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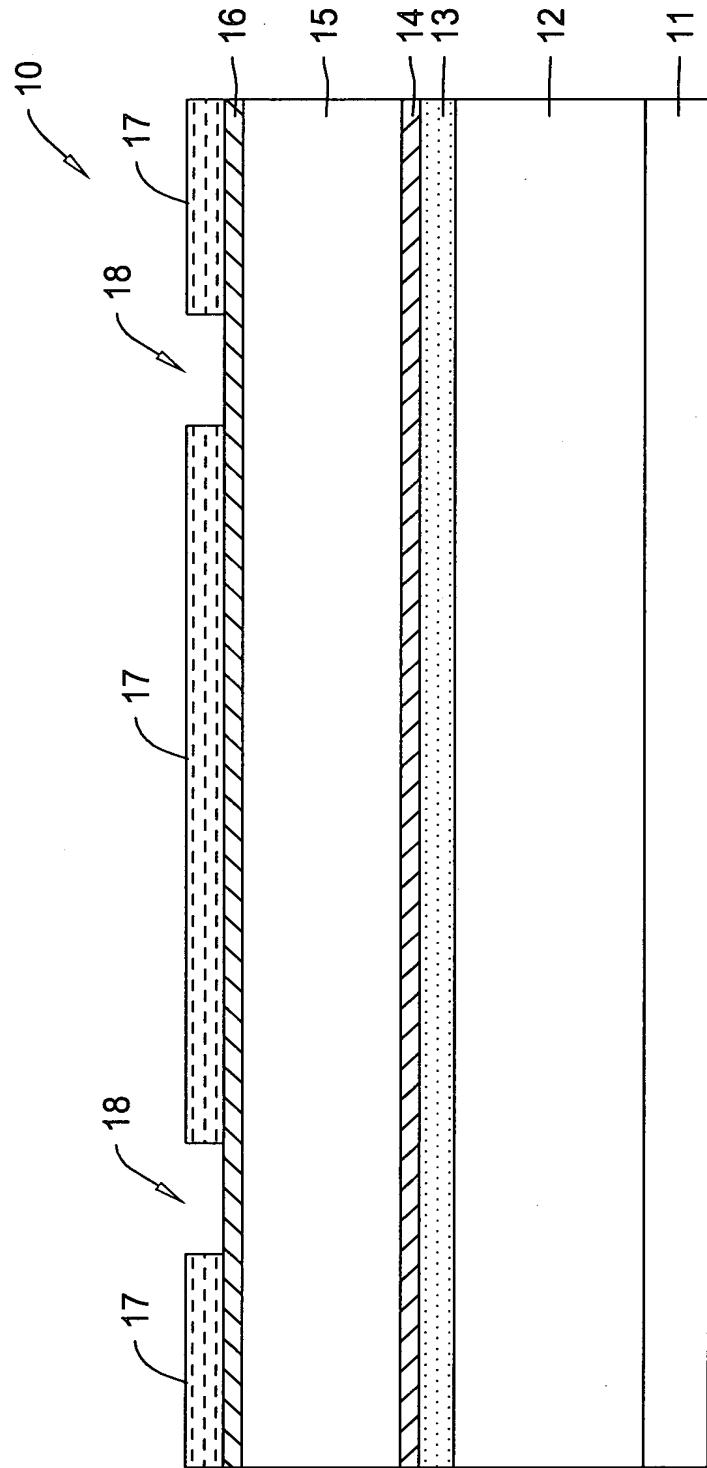


Figure 2A

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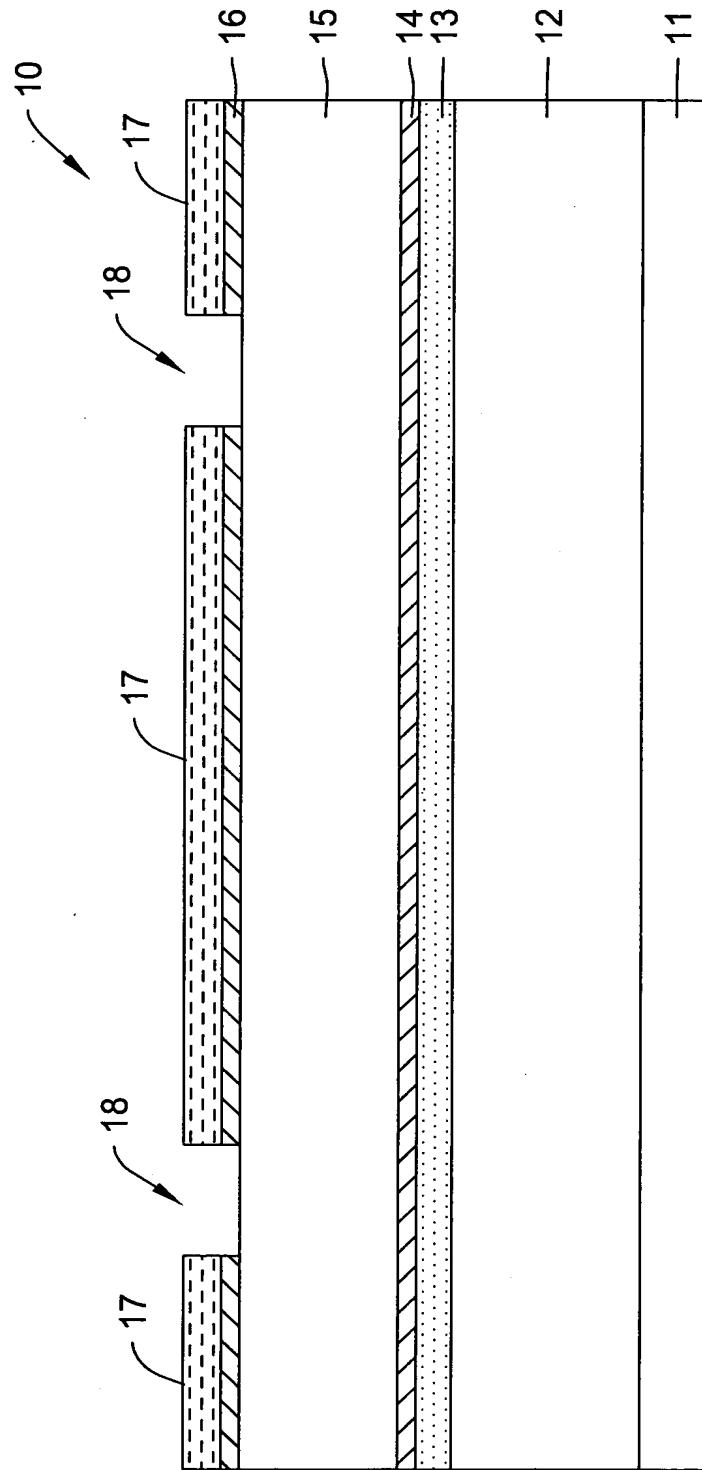


Figure 3

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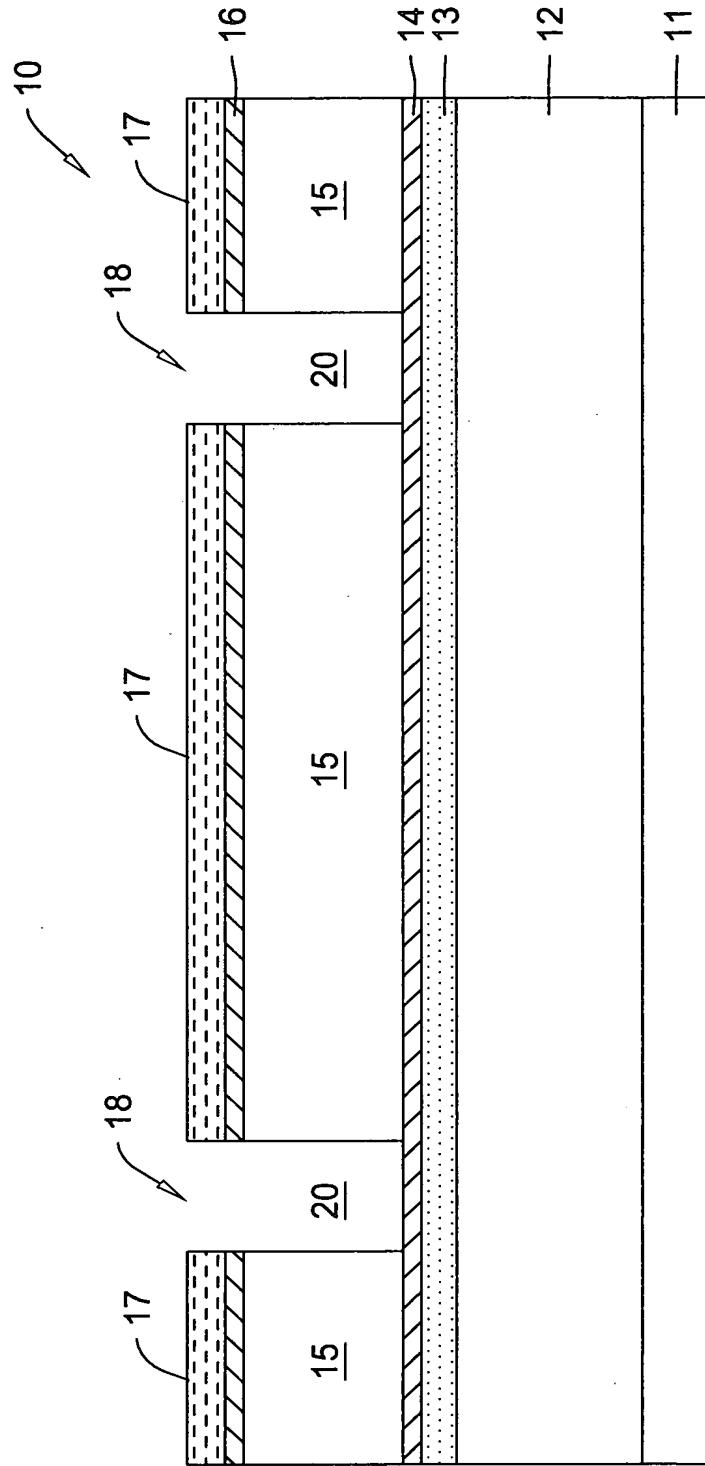


Figure 4

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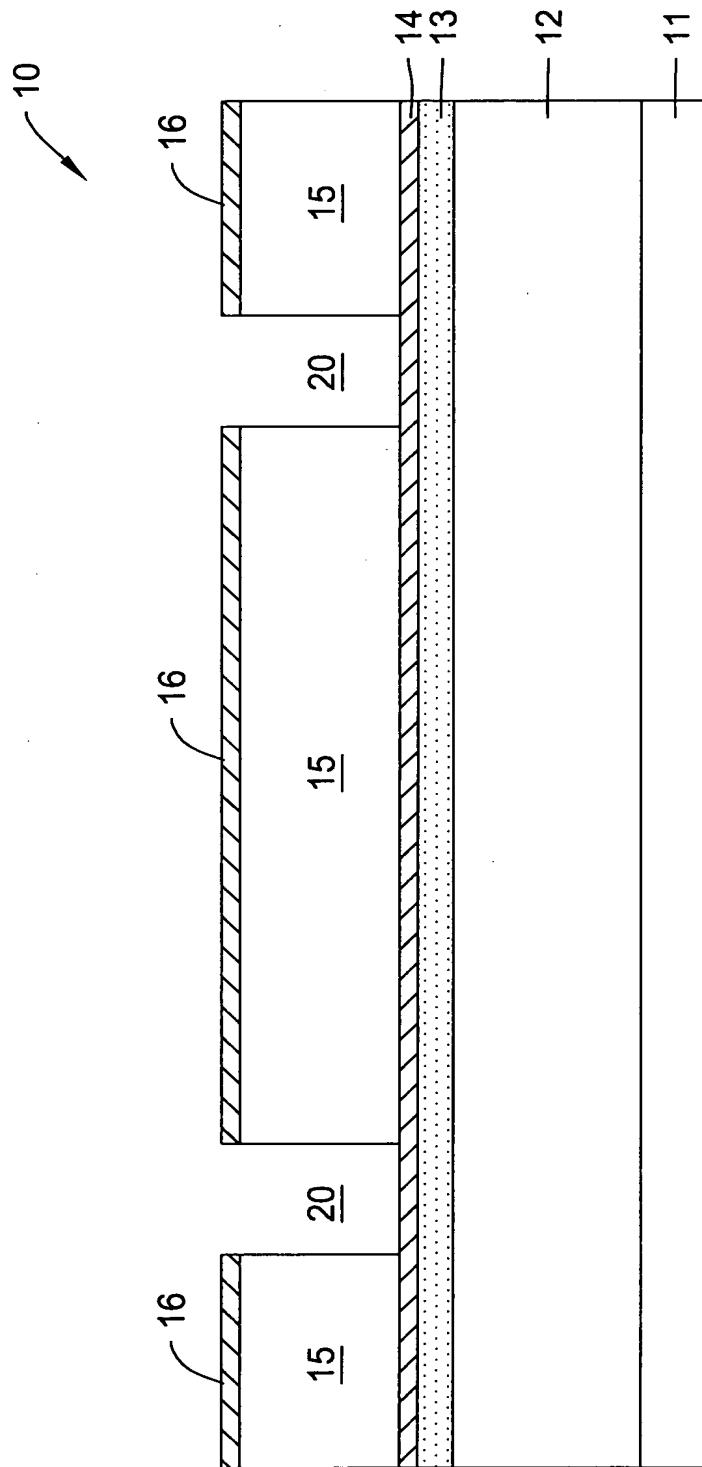


Figure 5

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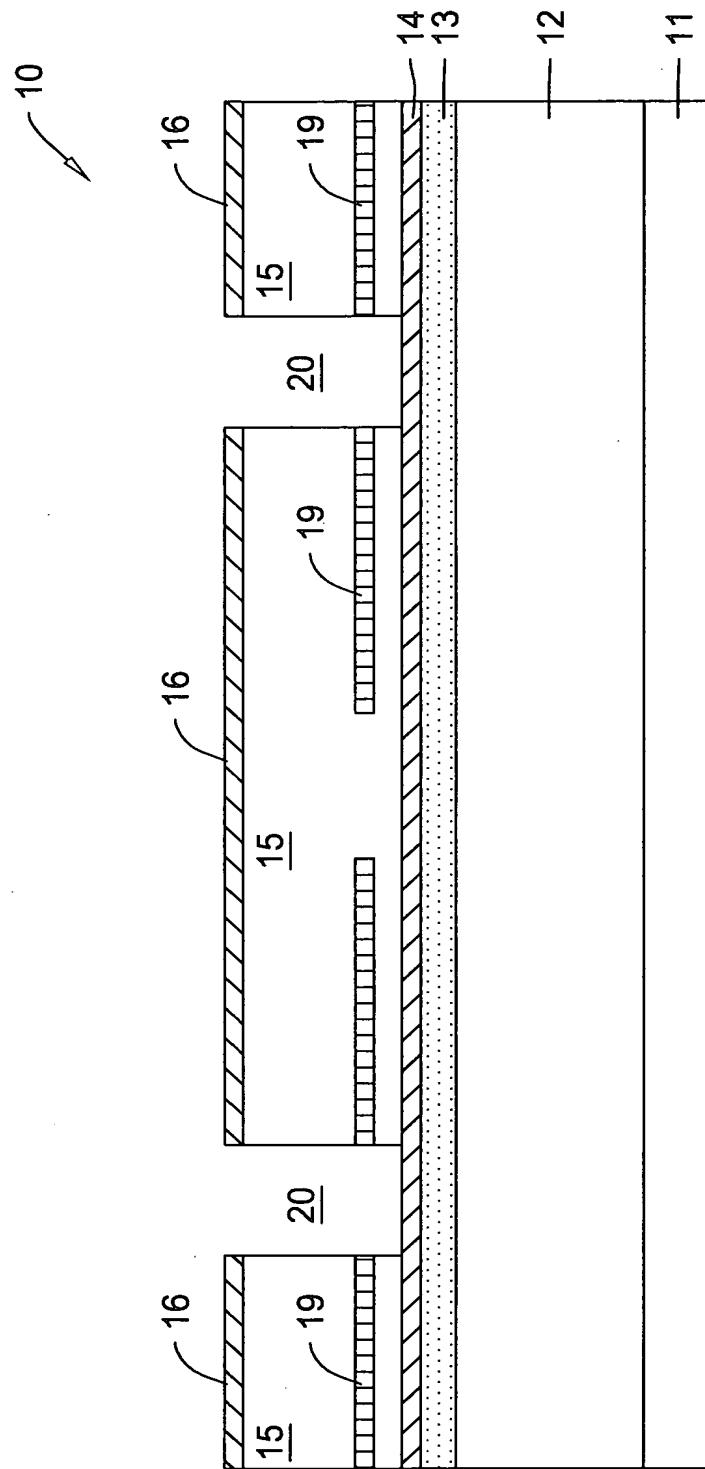


Figure 6

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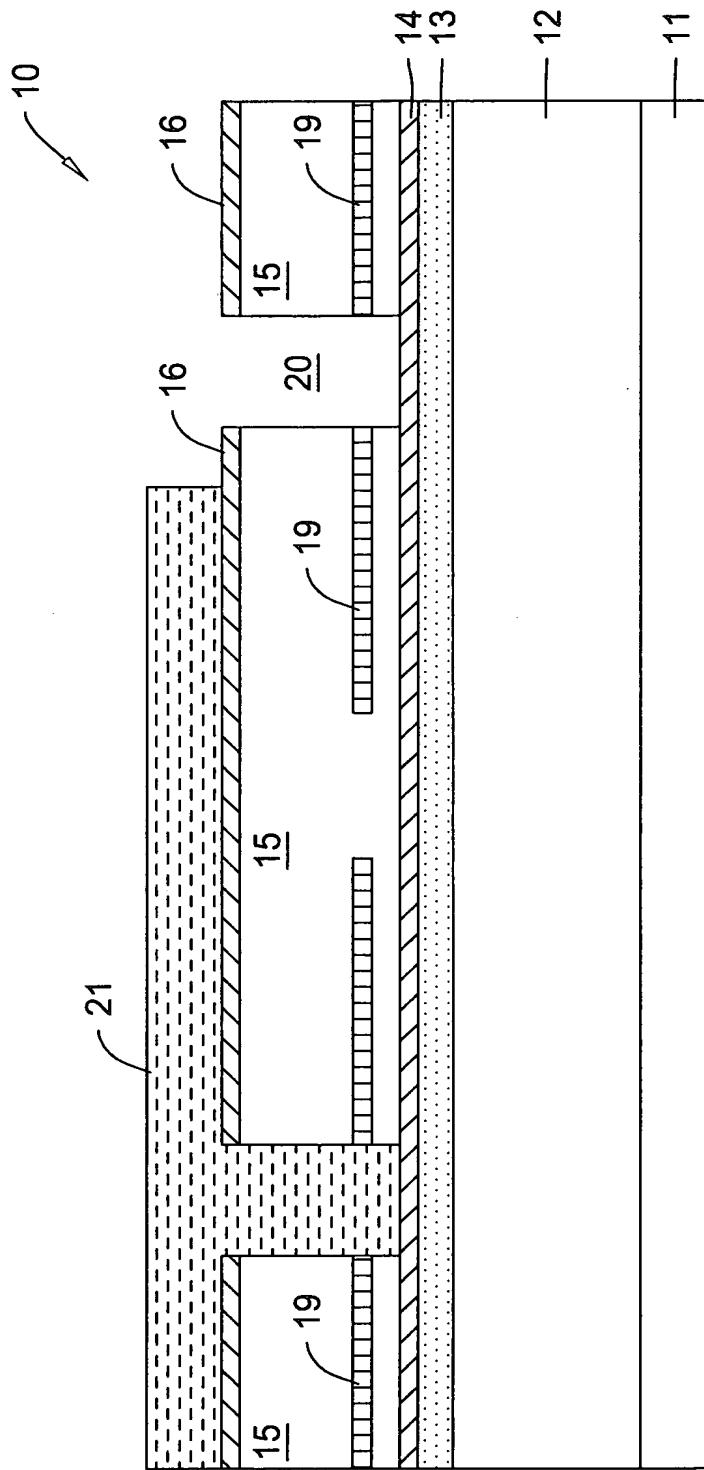


Figure 7

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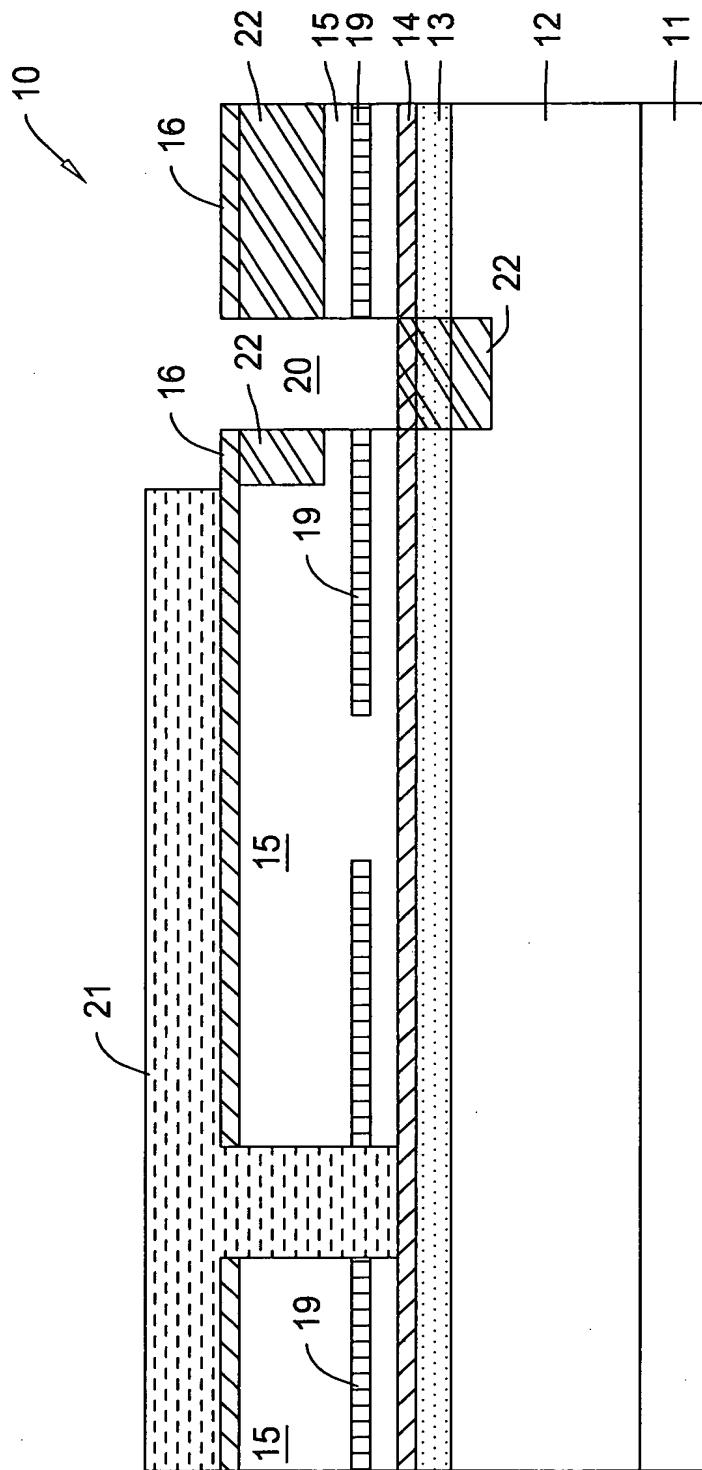


Figure 8

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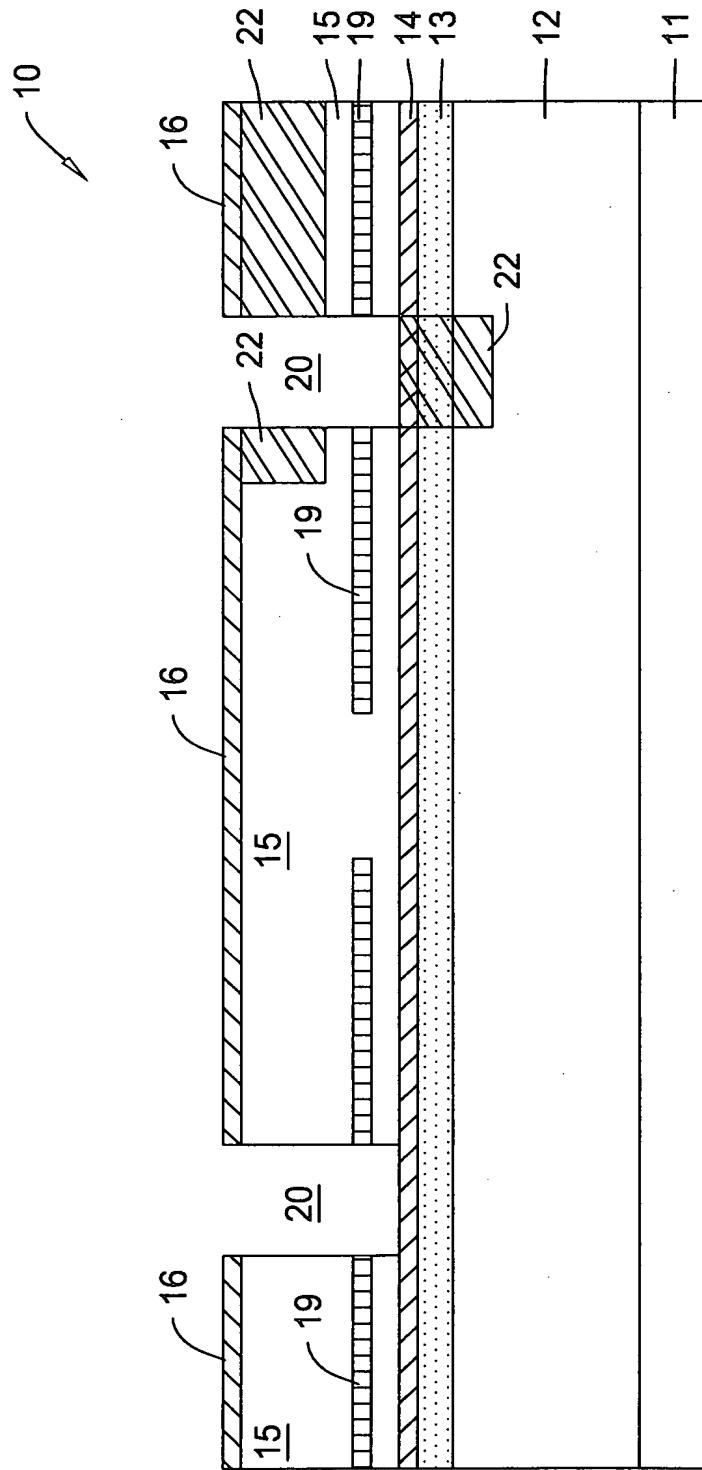


Figure 9

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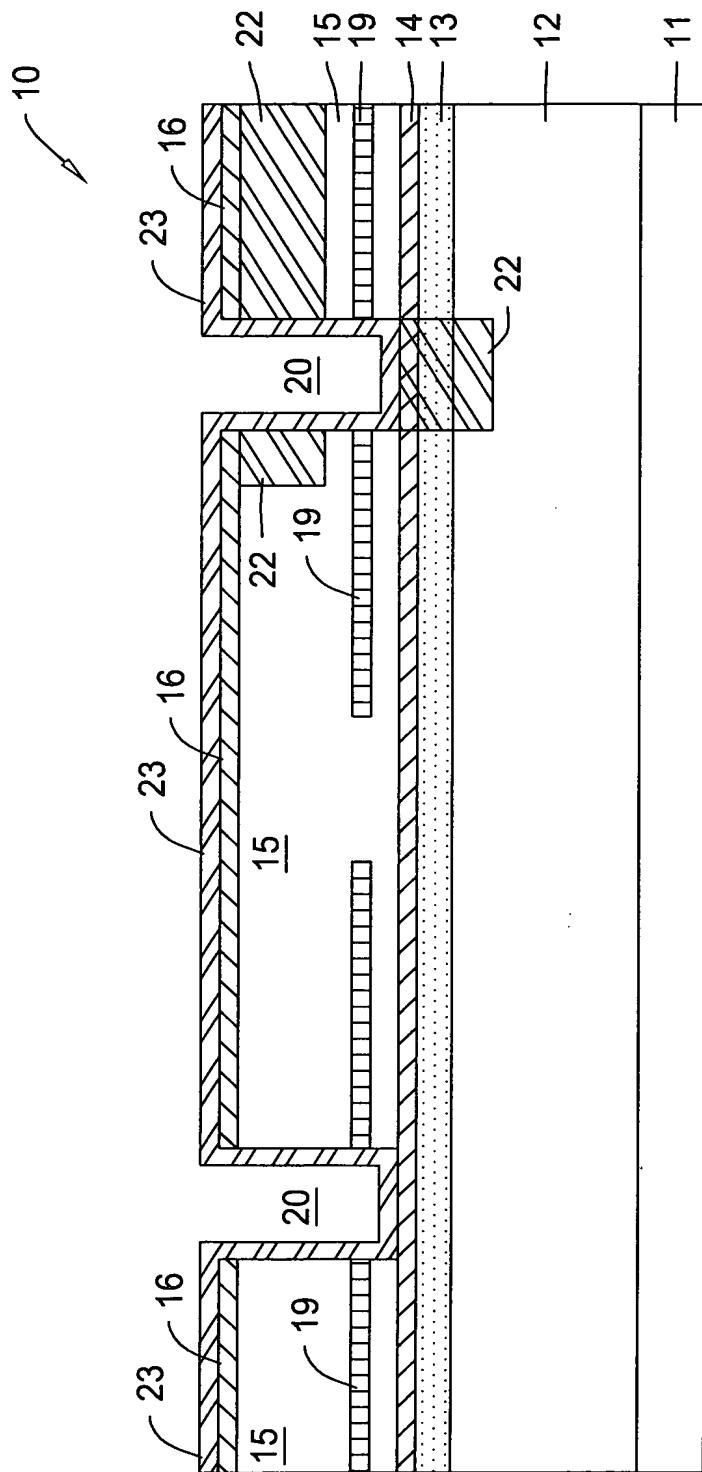


Figure 10

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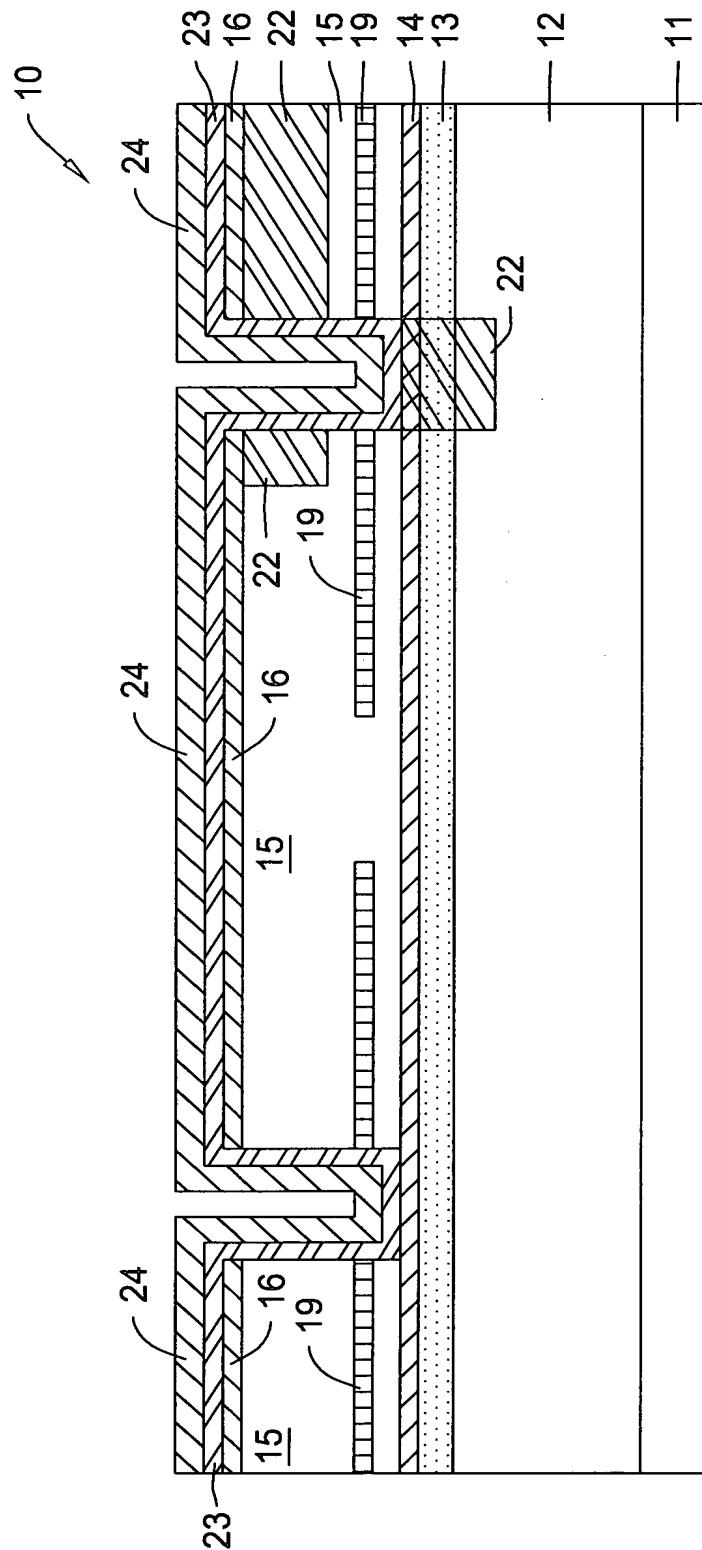


Figure 11

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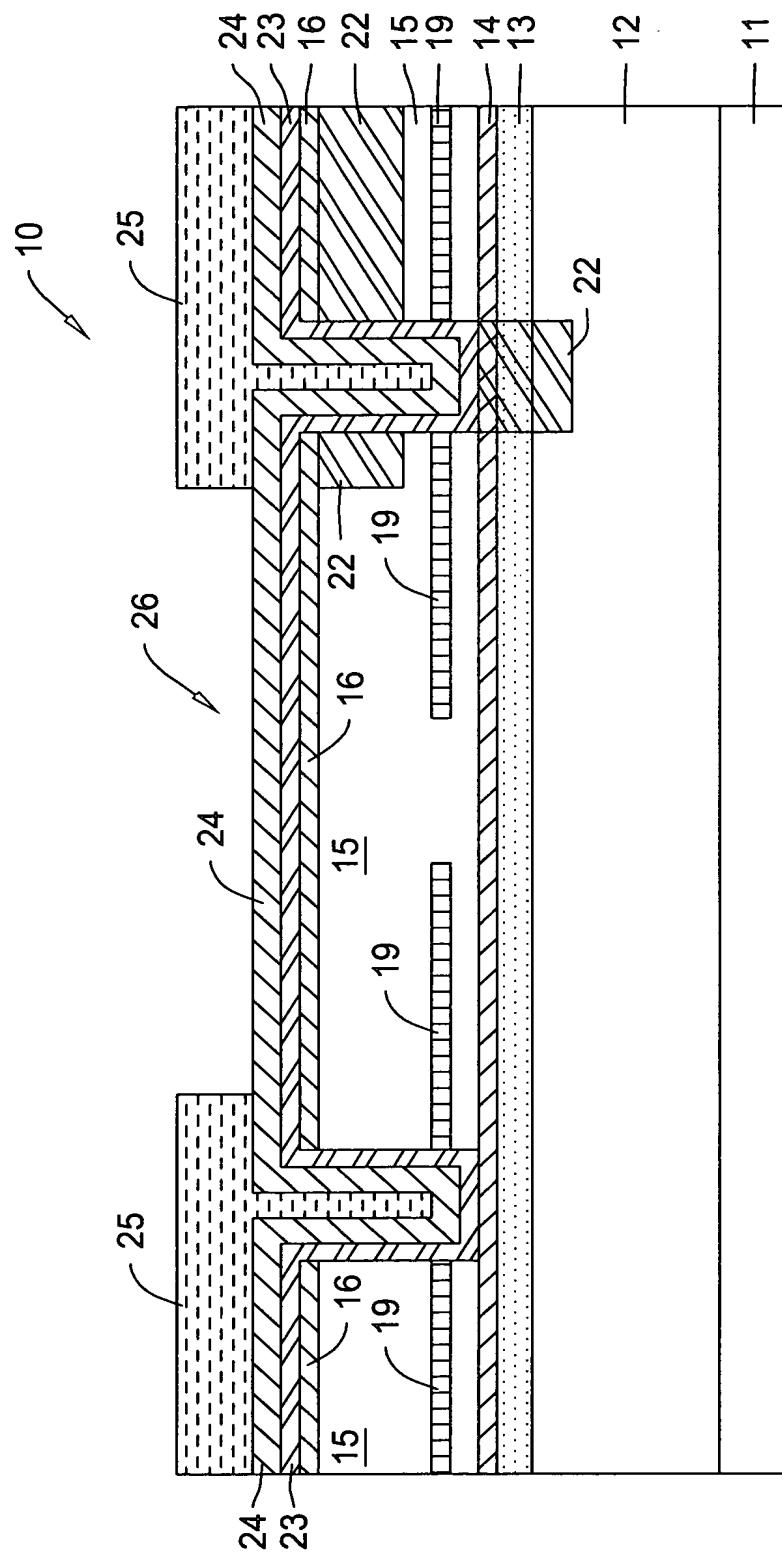


Figure 12

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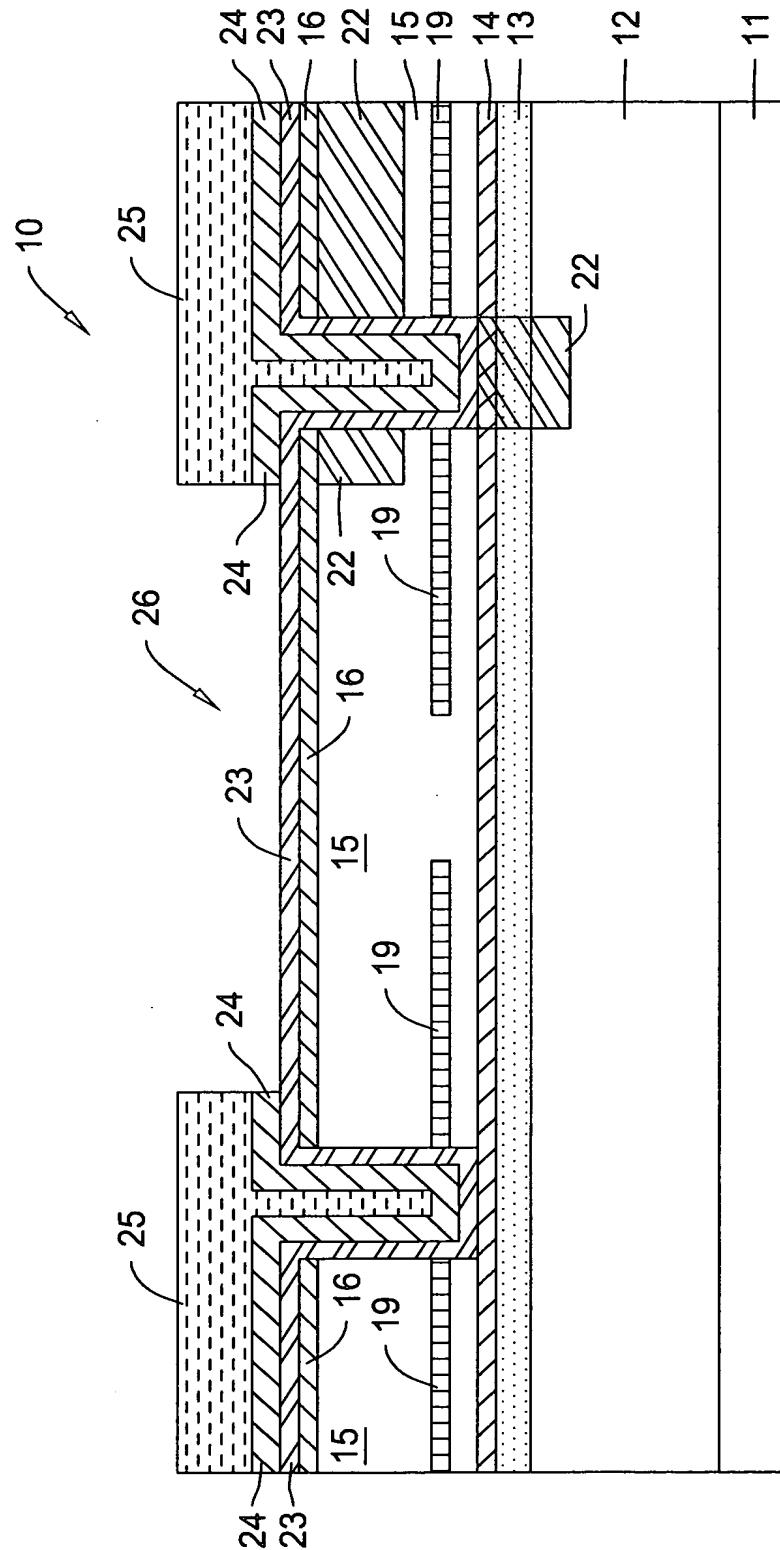


Figure 13

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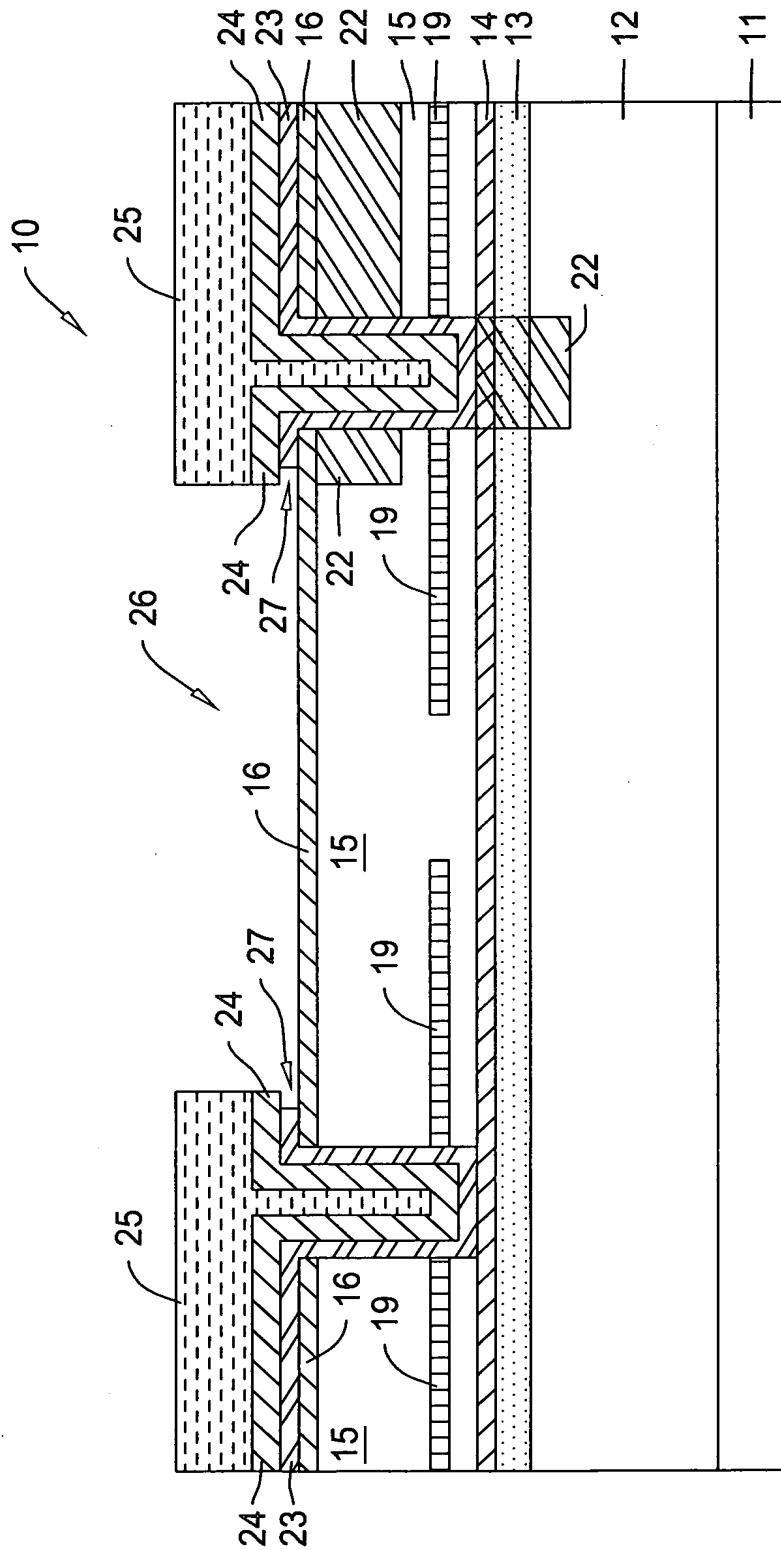


Figure 14

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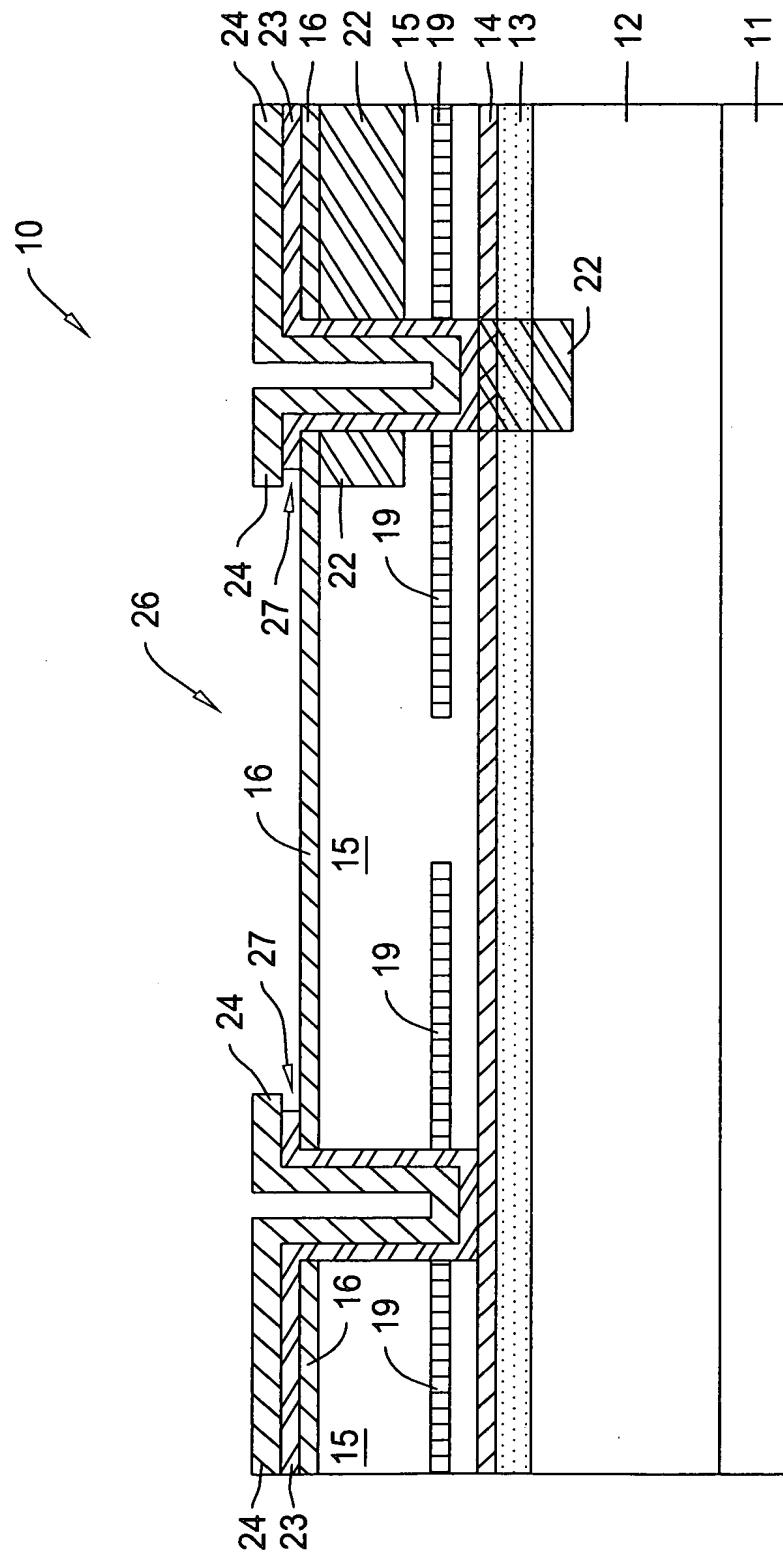


Figure 15

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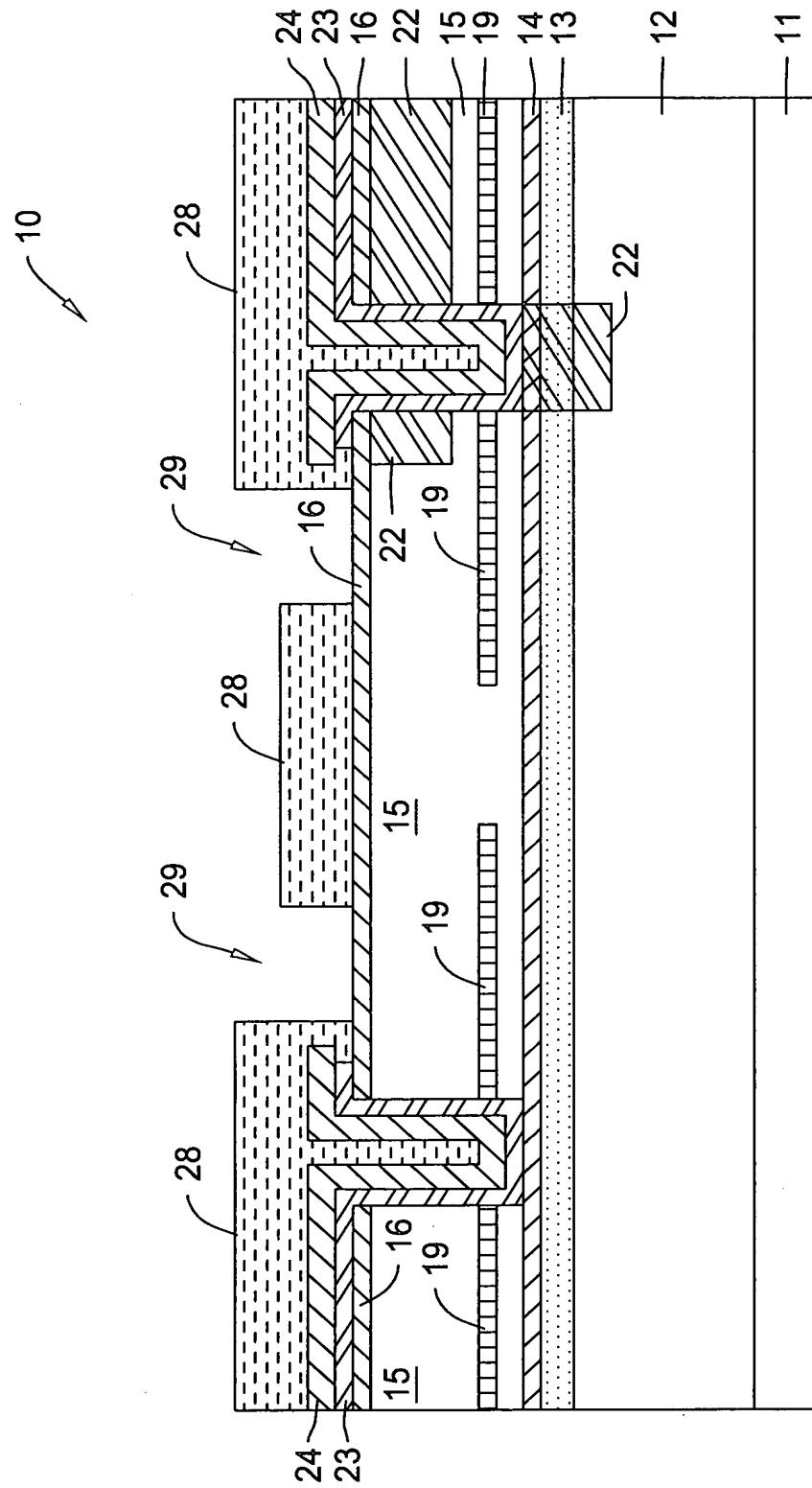


Figure 16

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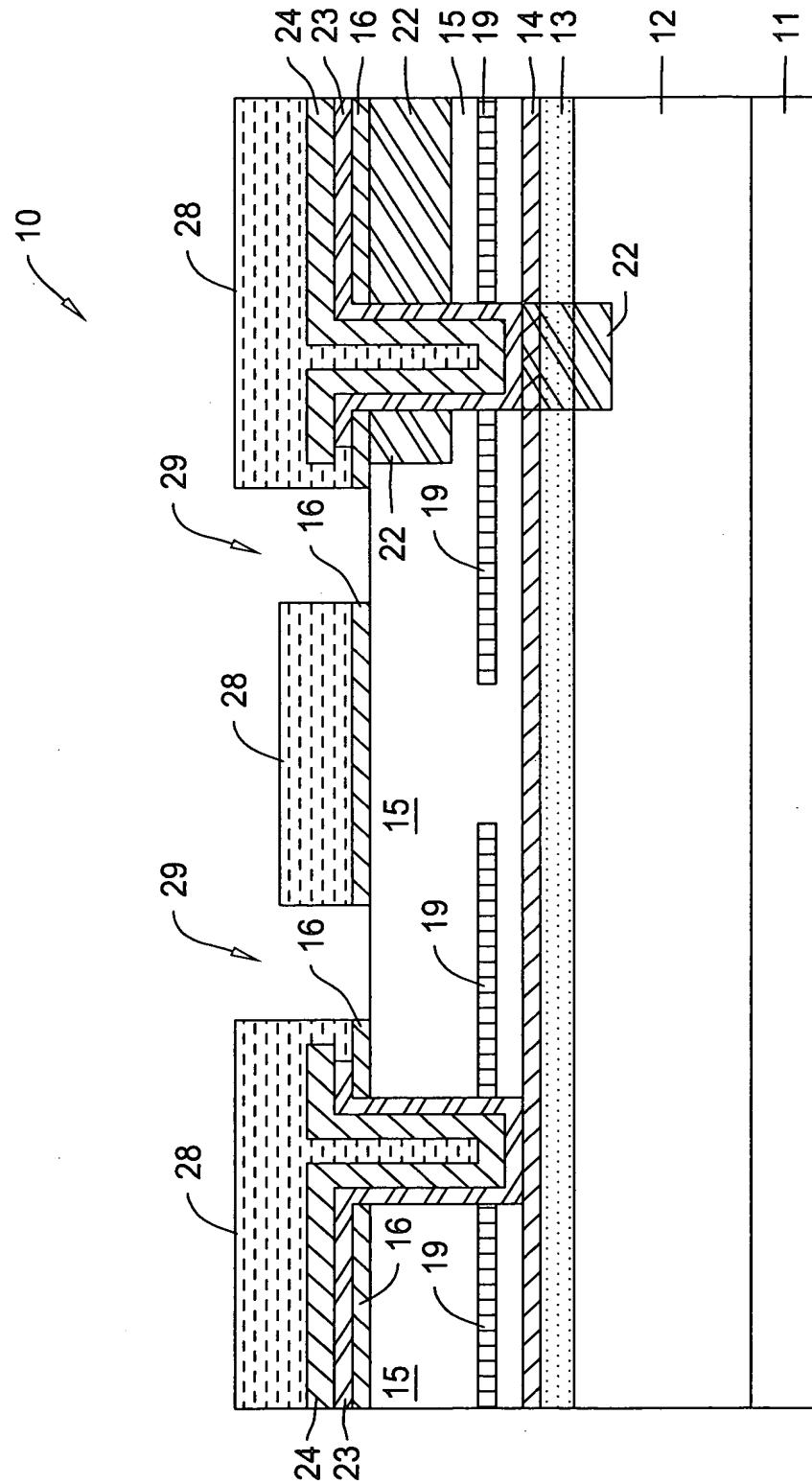


Figure 17

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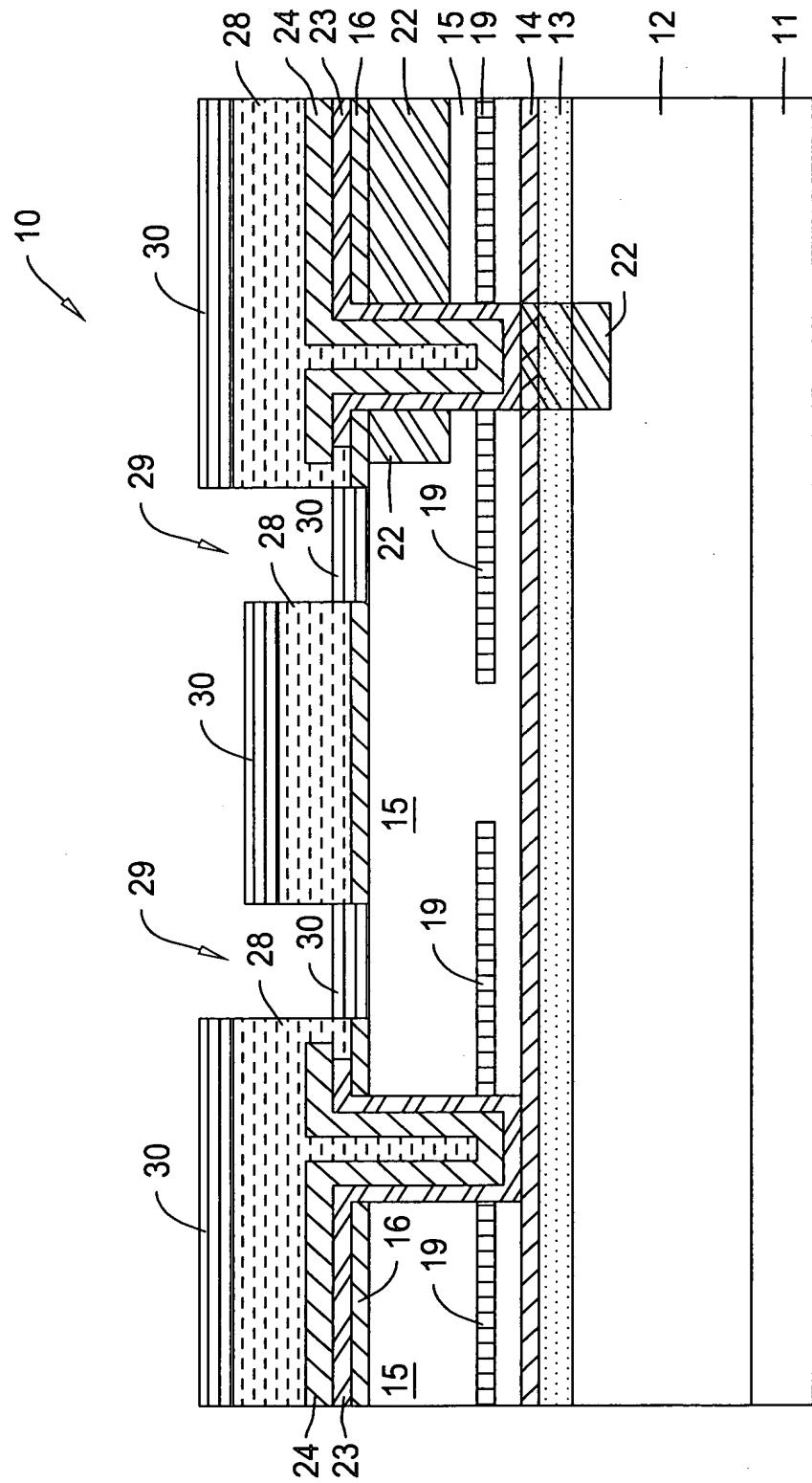


Figure 18

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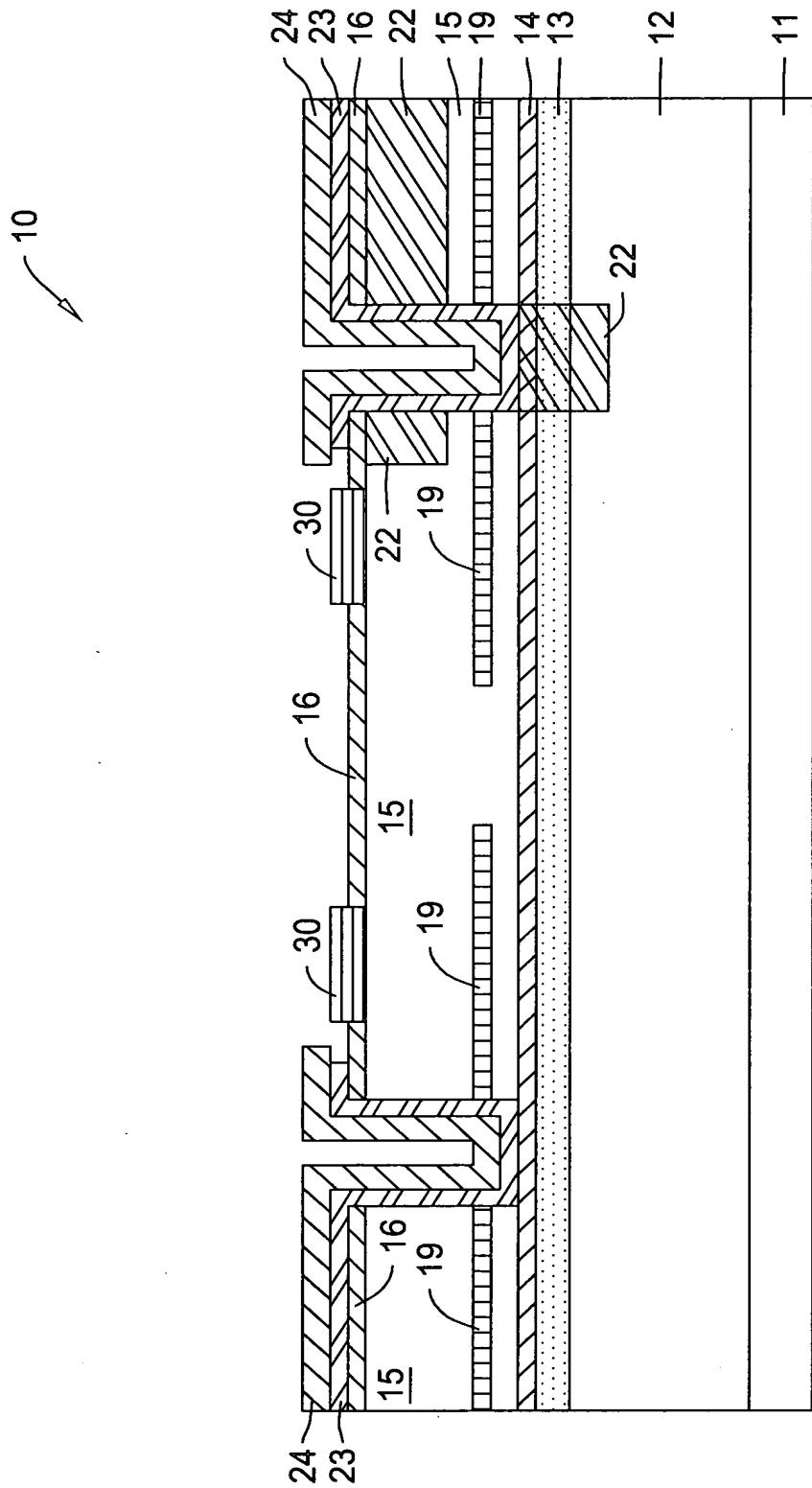


Figure 19

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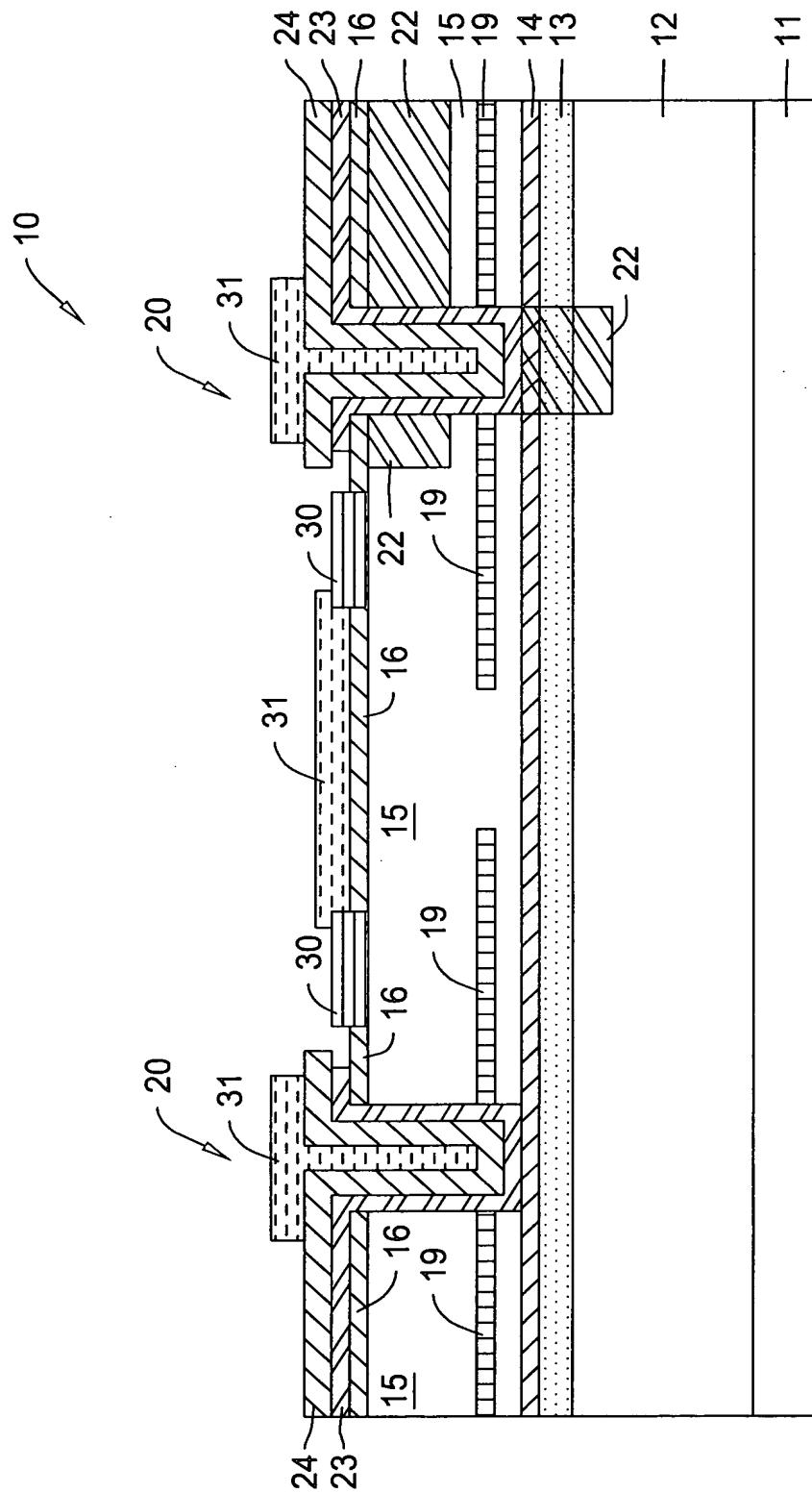


Figure 20

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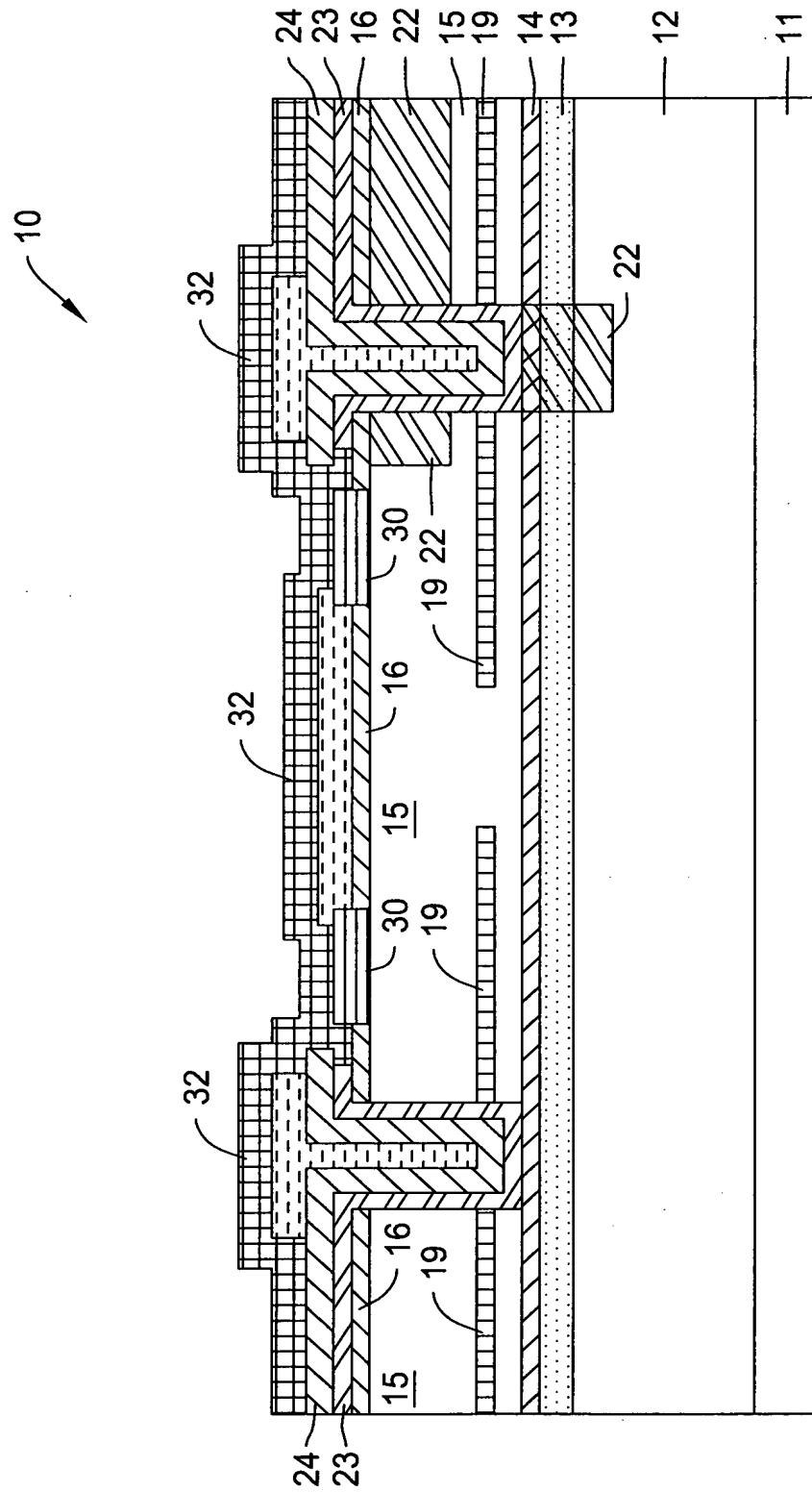


Figure 21

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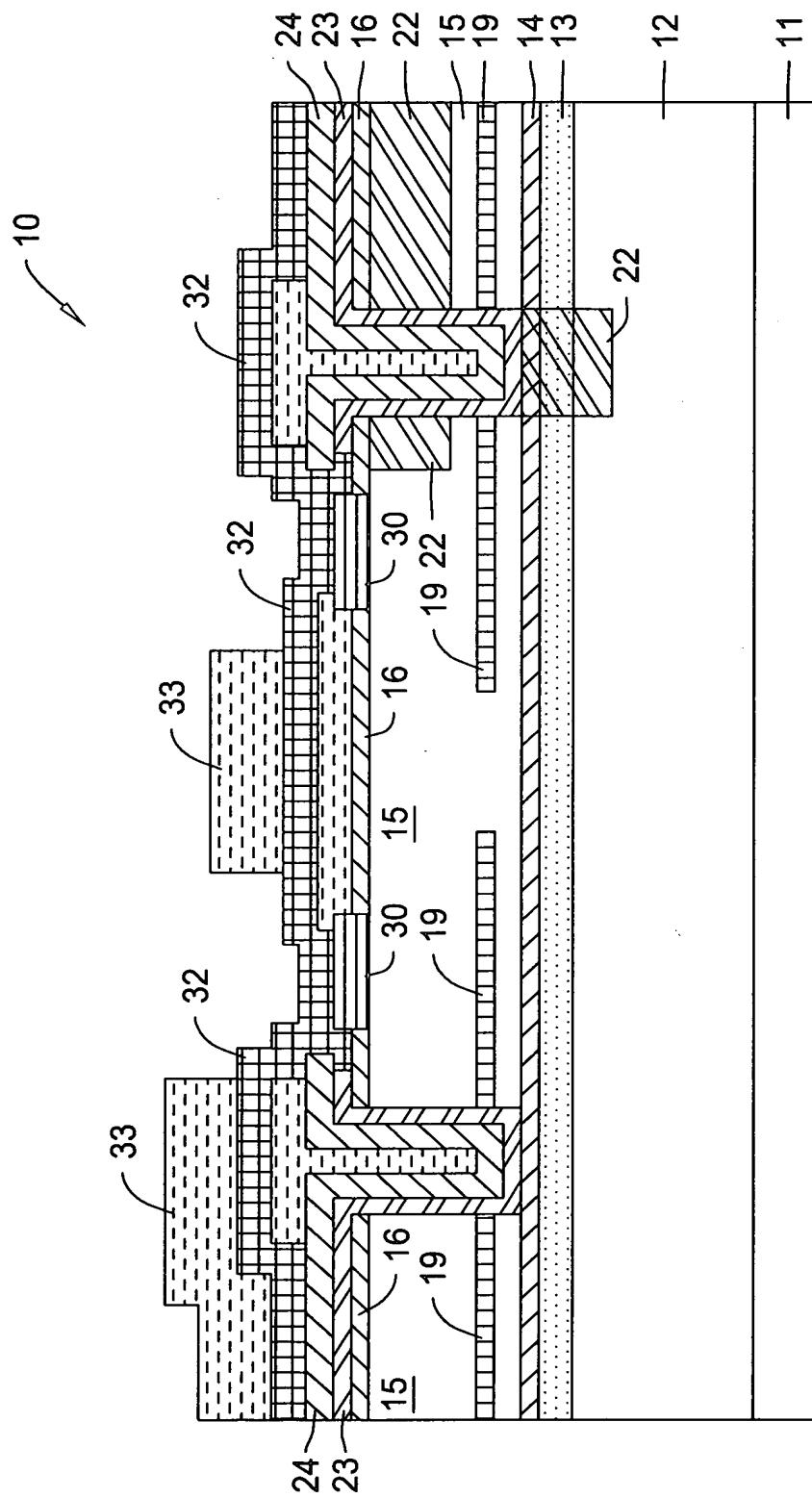


Figure 22

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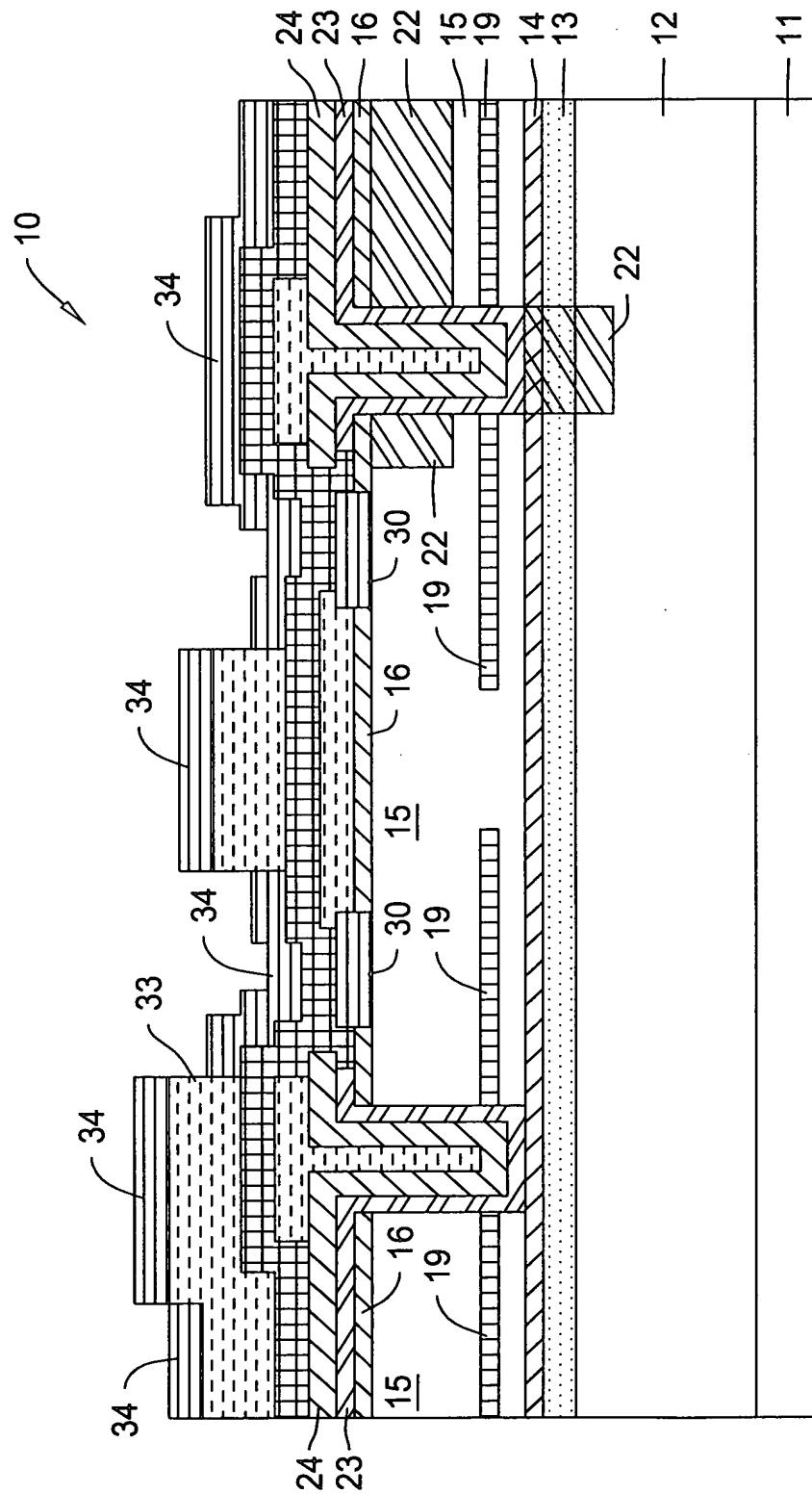


Figure 23

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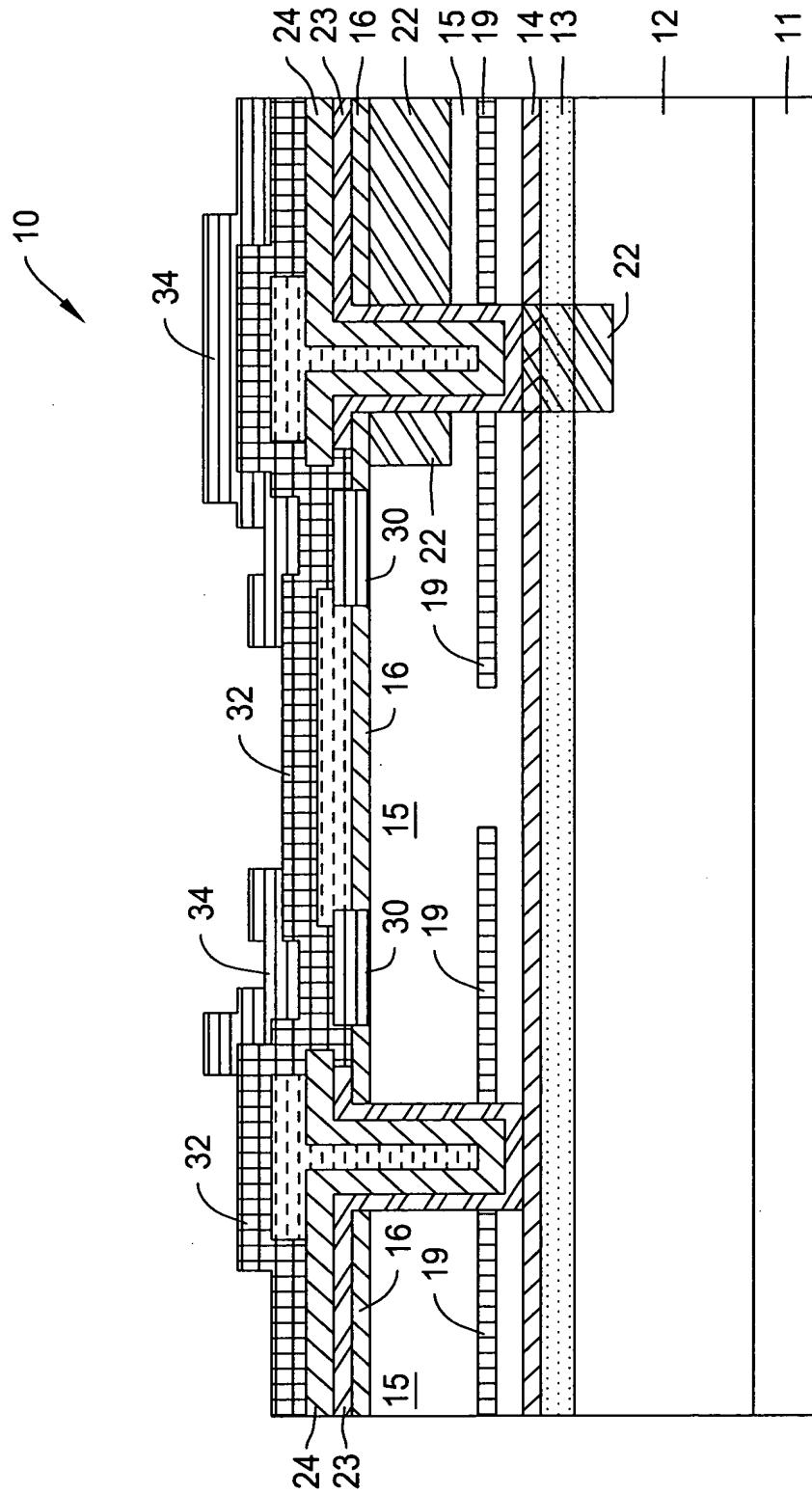


Figure 24

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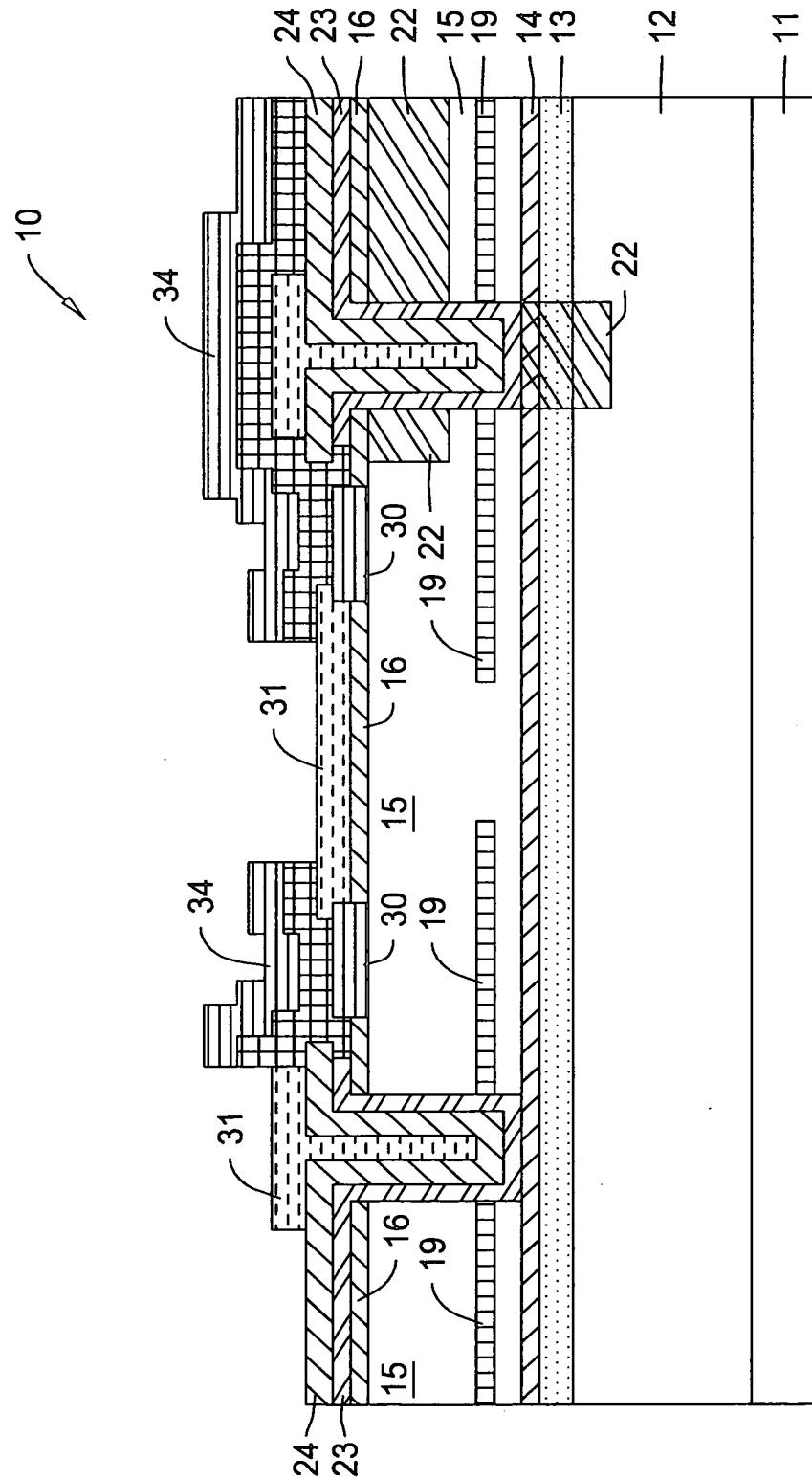


Figure 25

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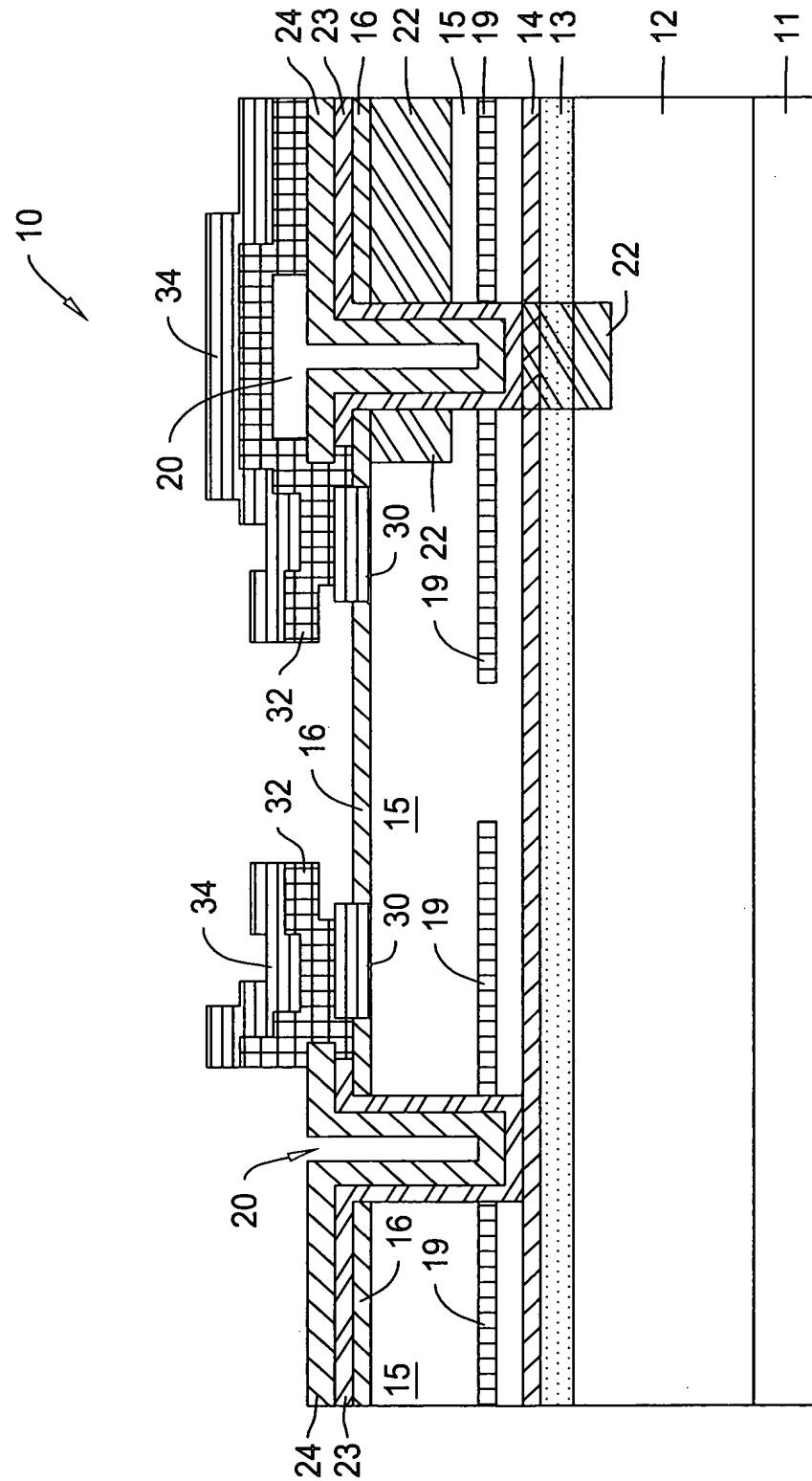


Figure 26

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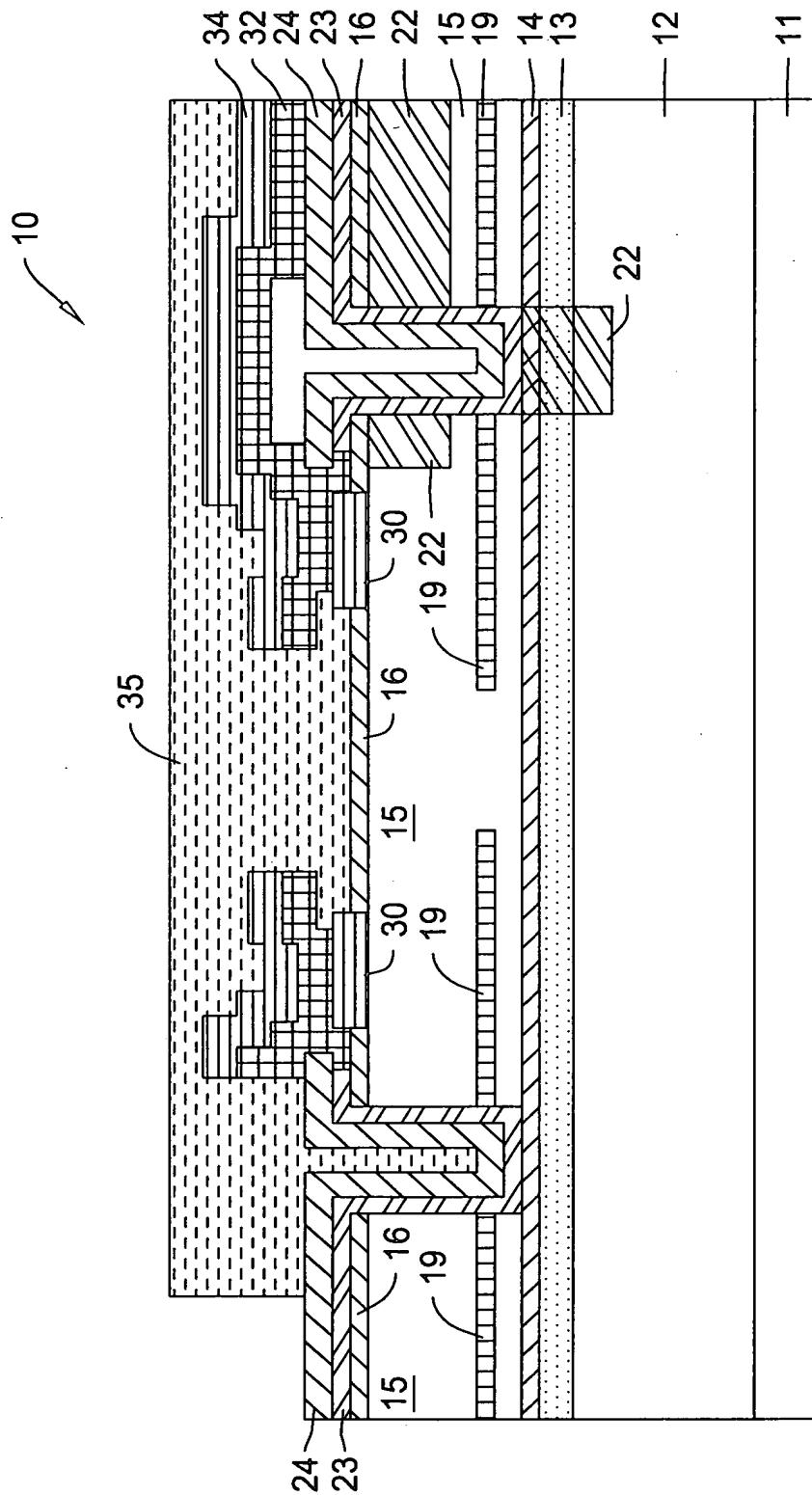


Figure 27

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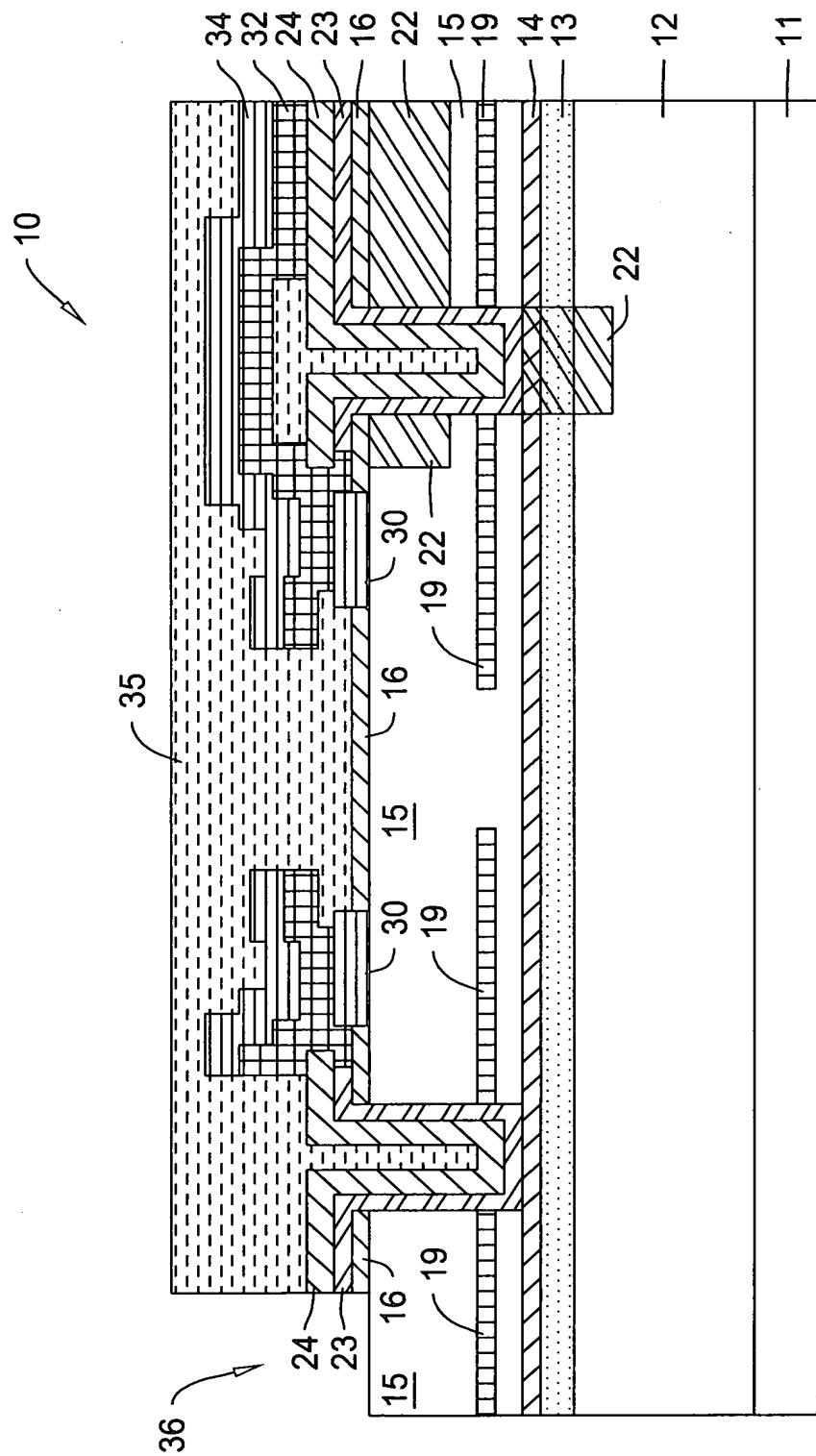


Figure 28

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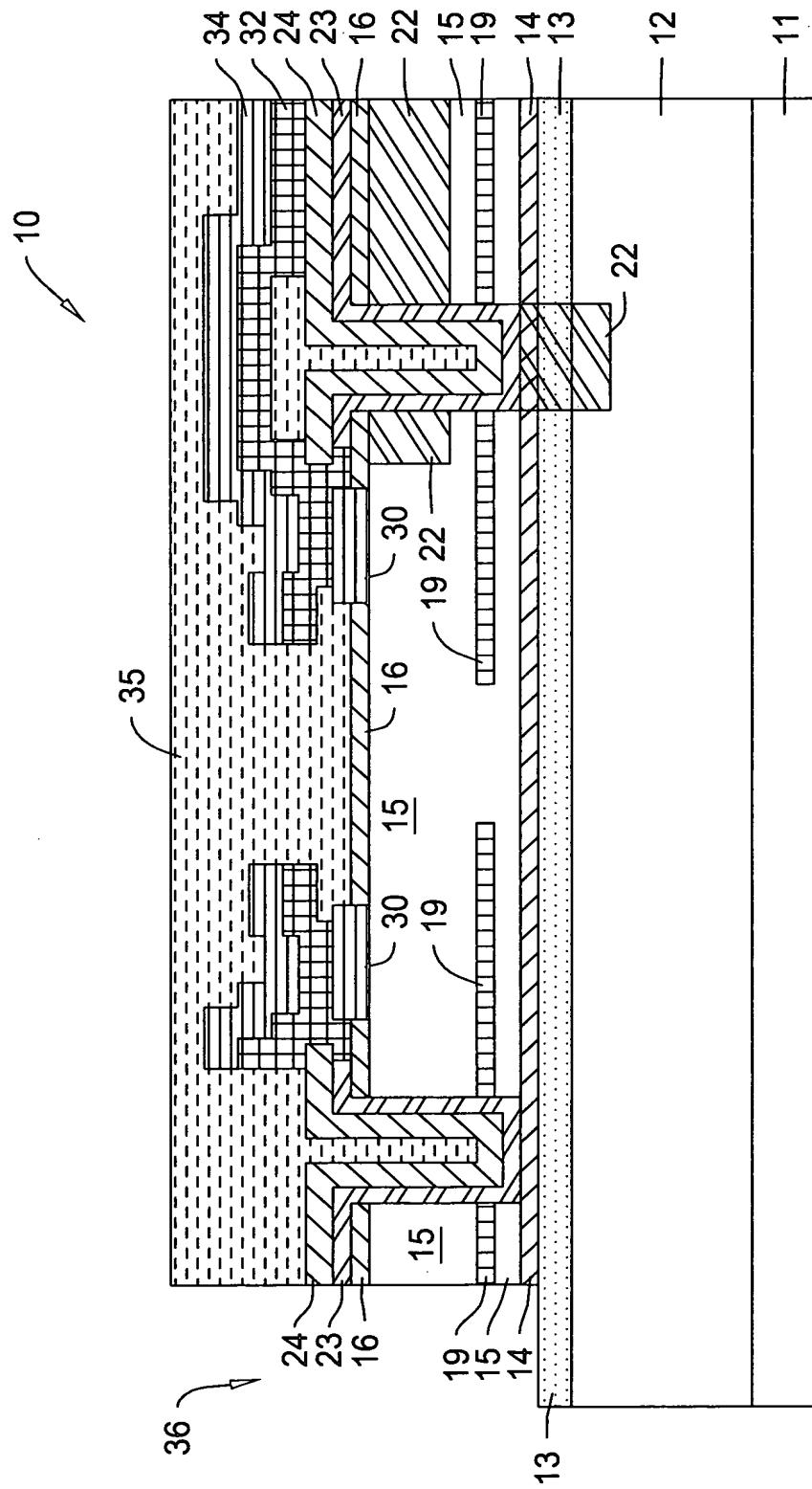


Figure 29

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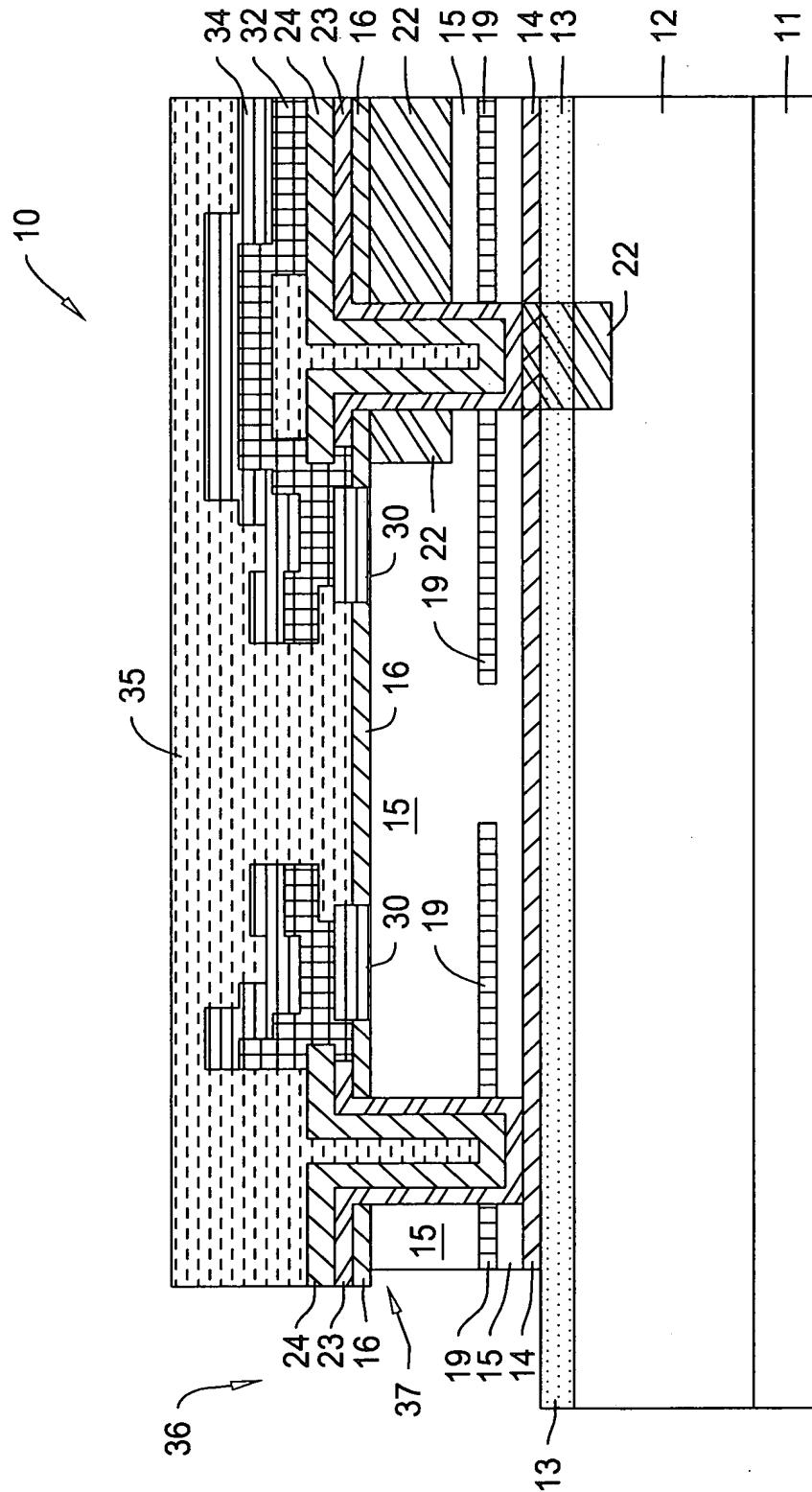


Figure 30

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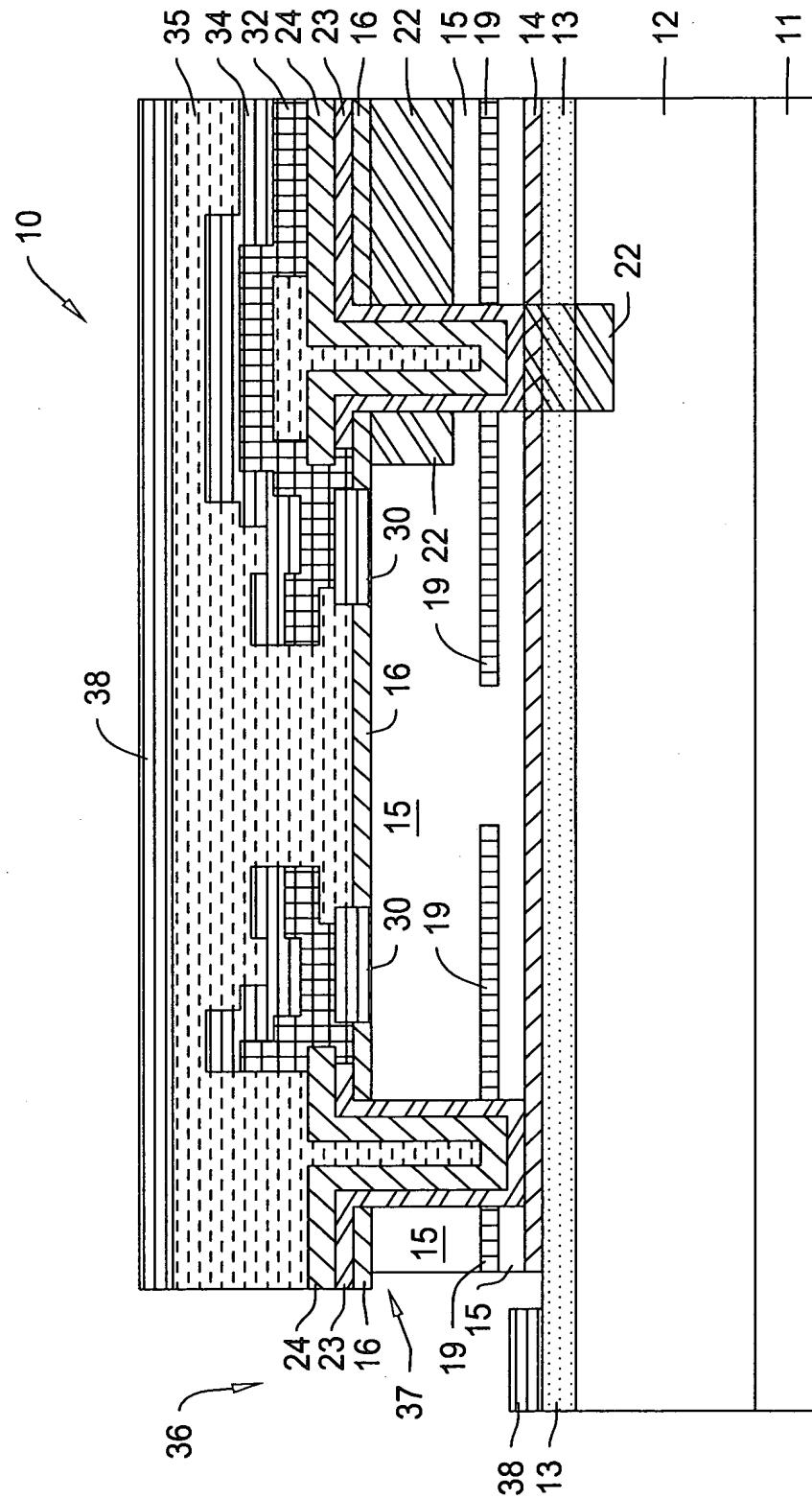


Figure 31

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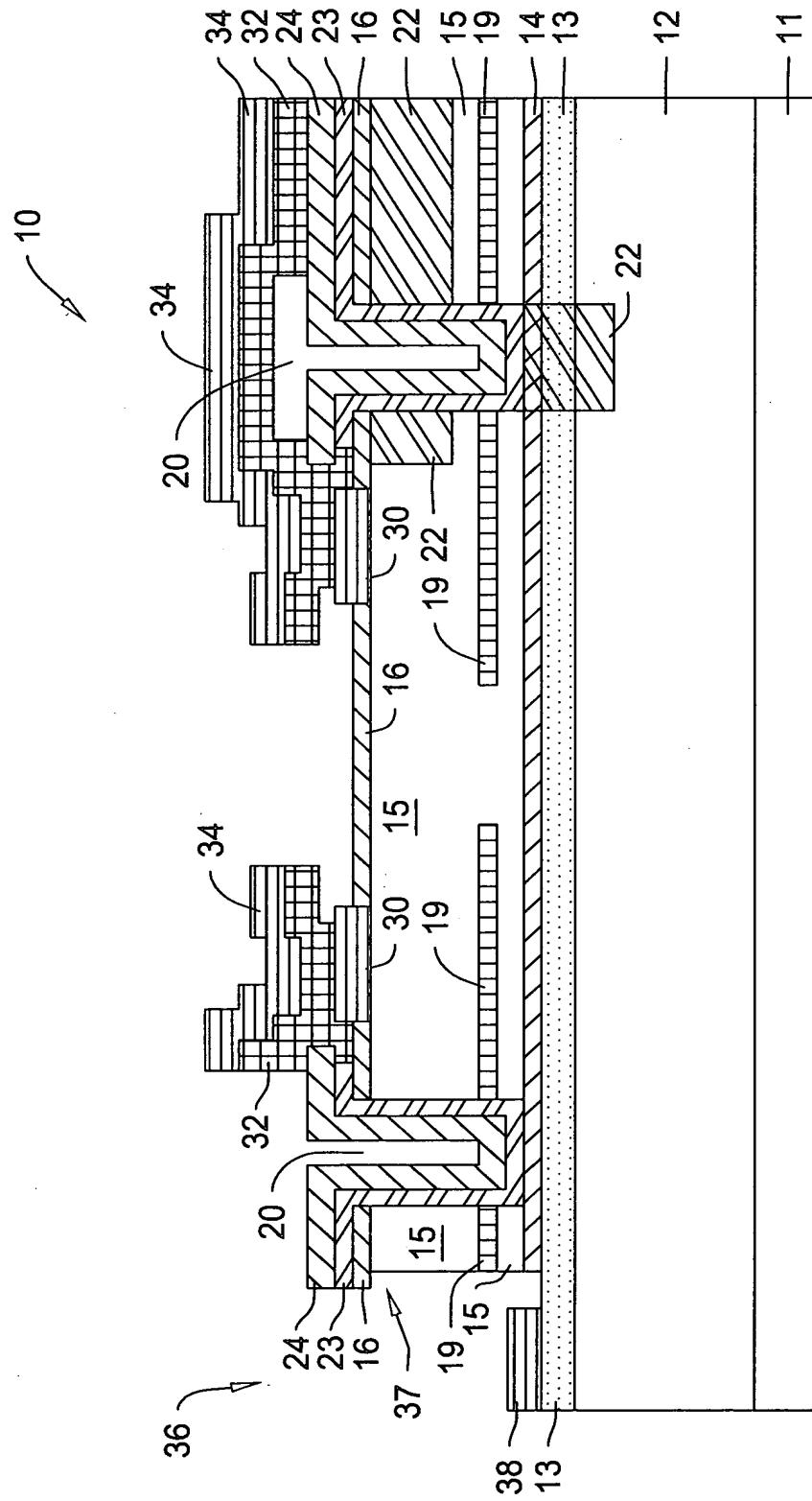


Figure 32

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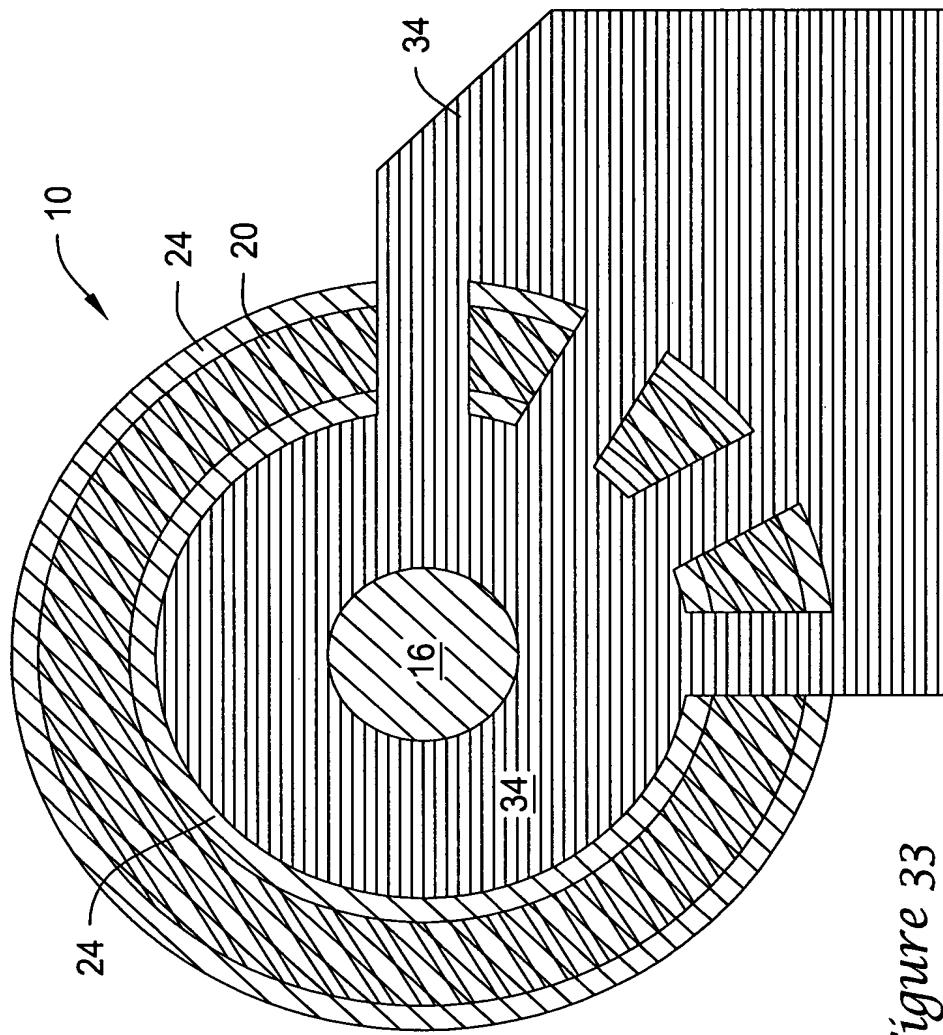


Figure 33

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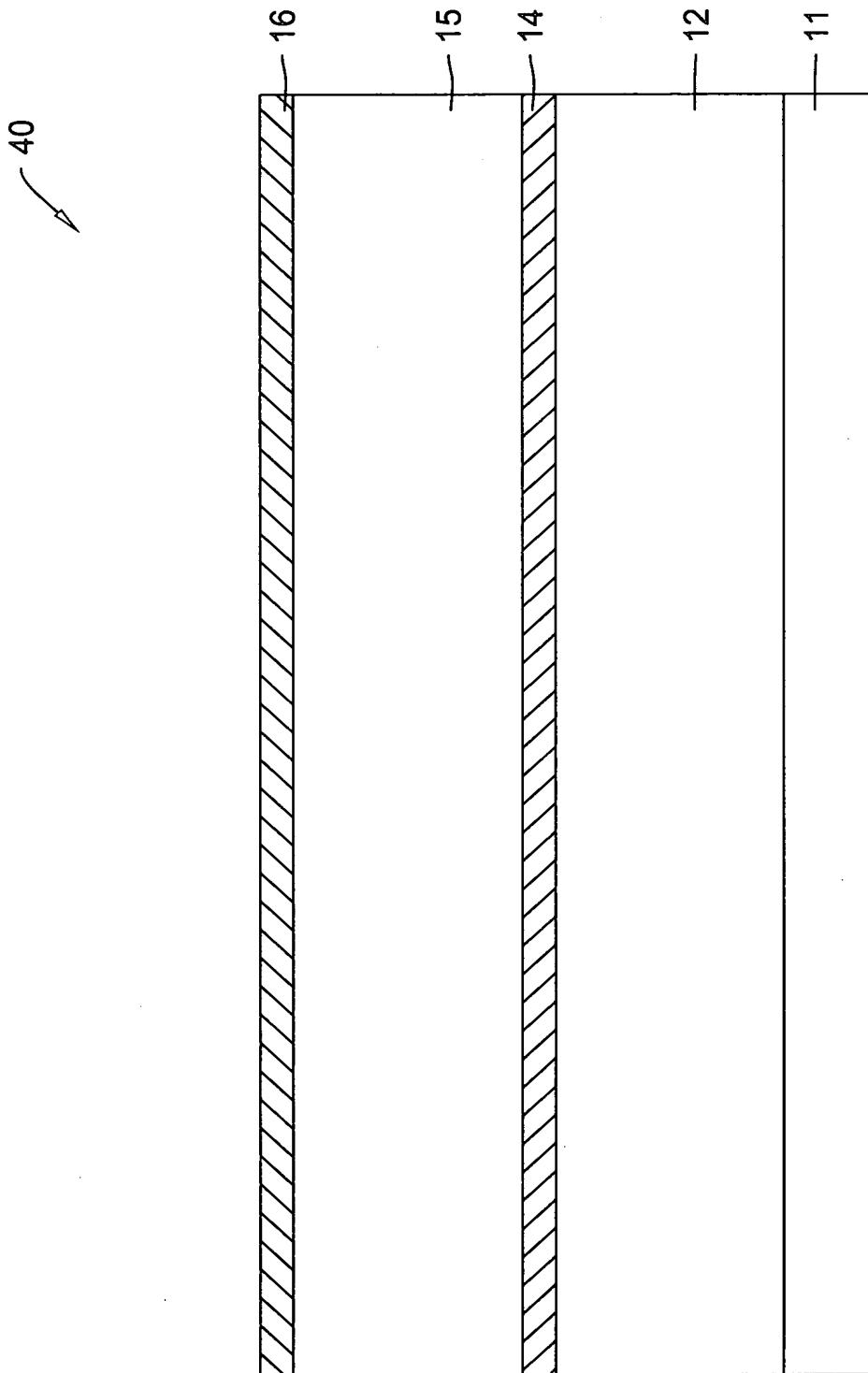


Figure 34

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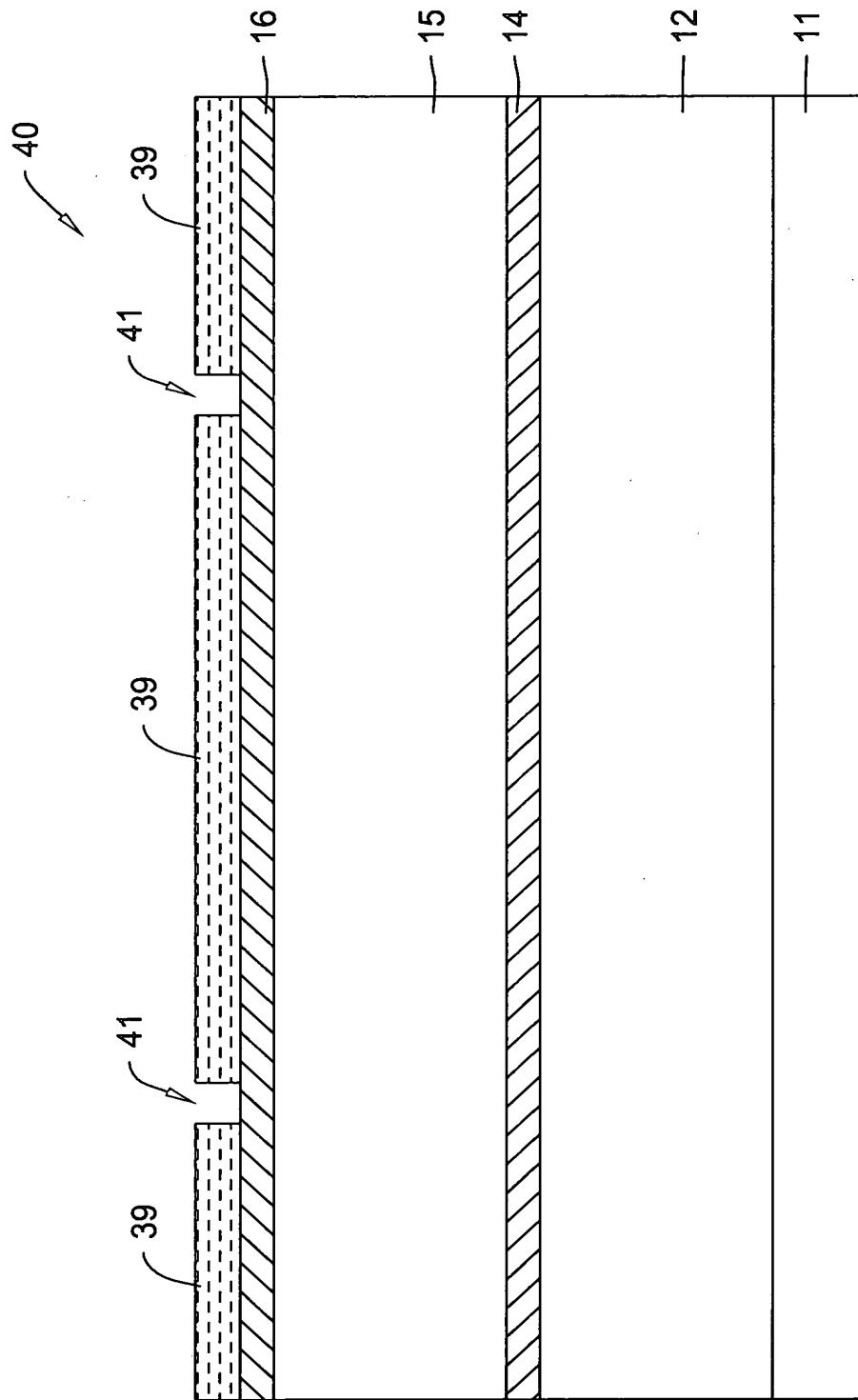


Figure 35

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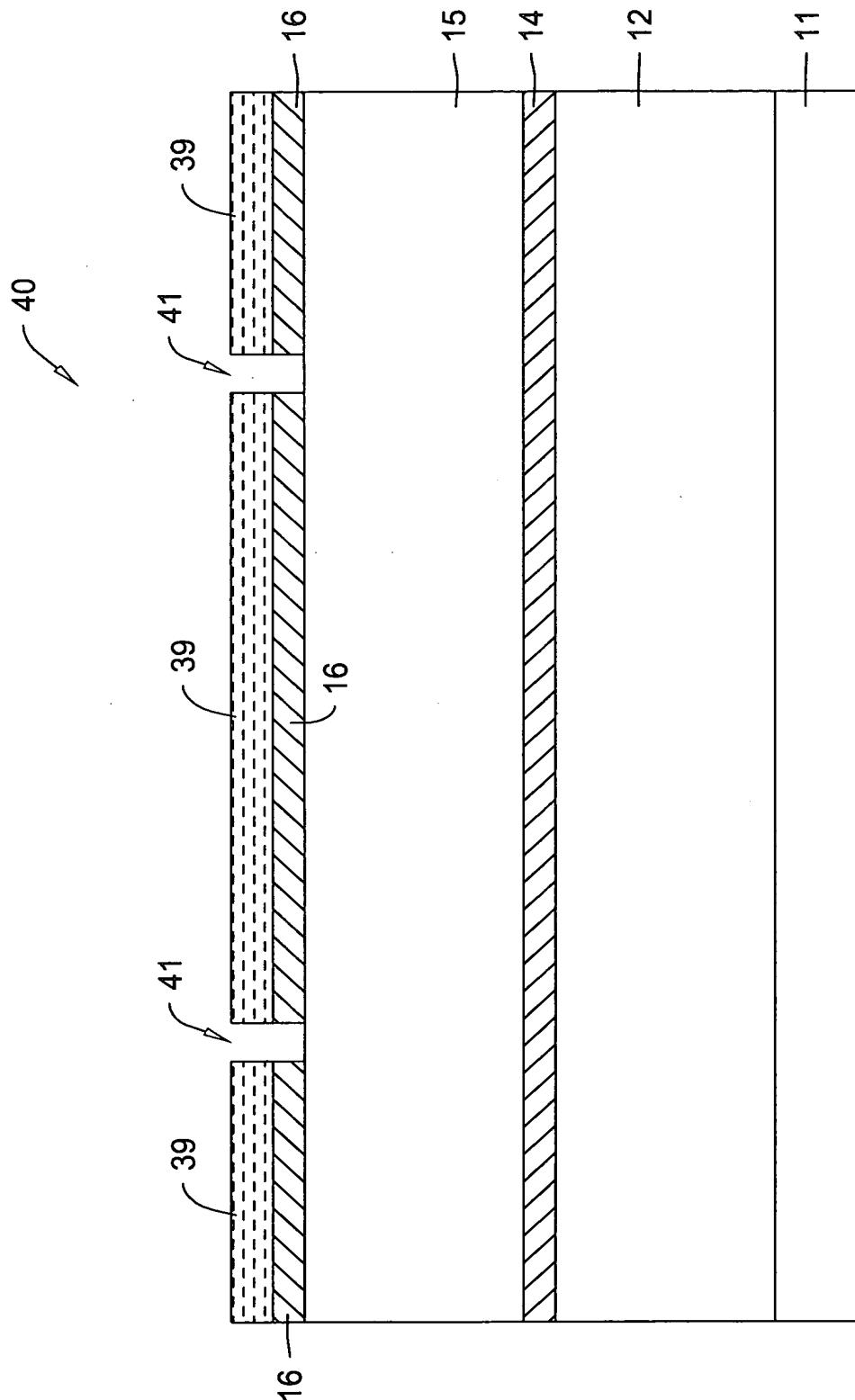


Figure 36

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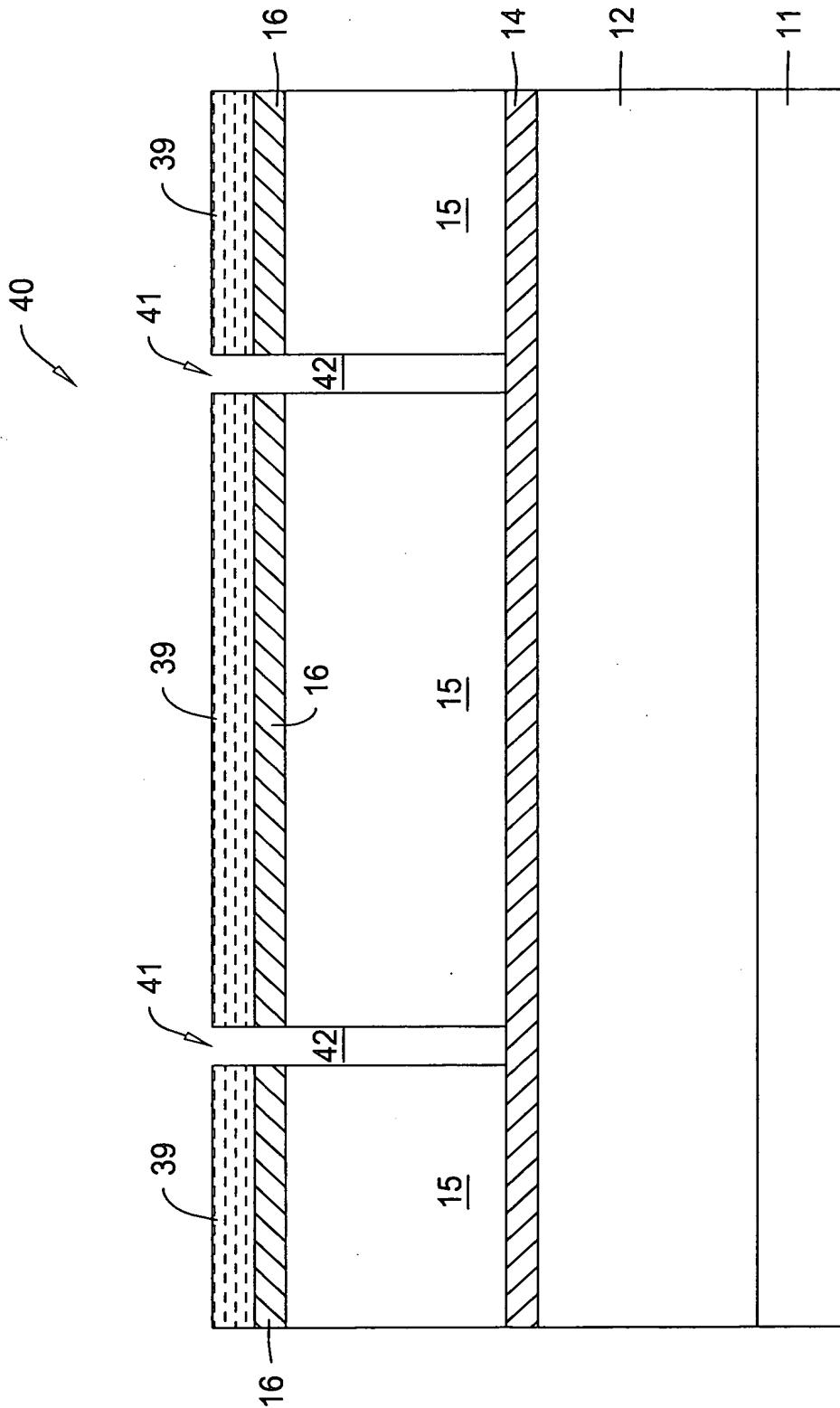


Figure 37

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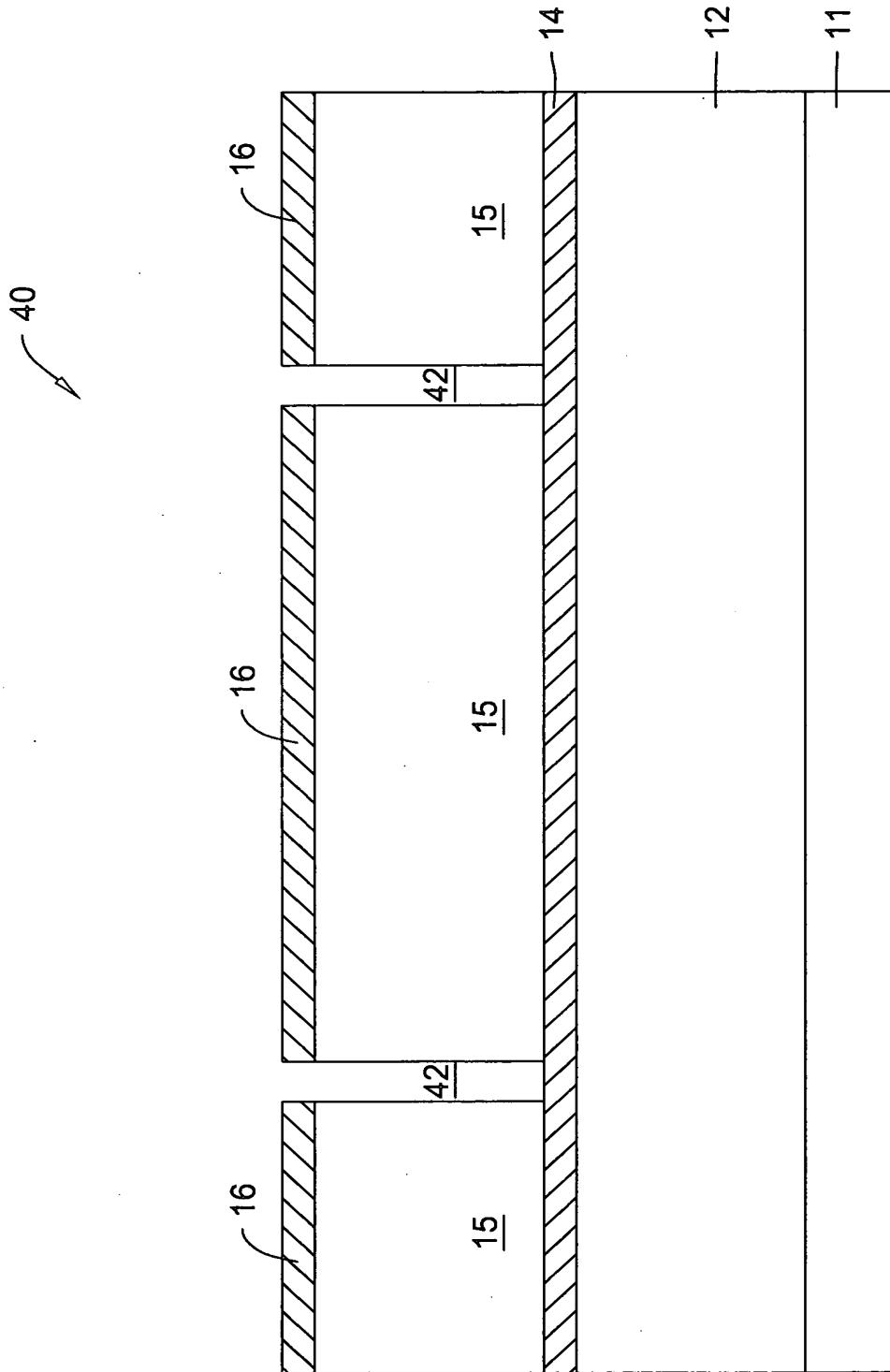


Figure 38

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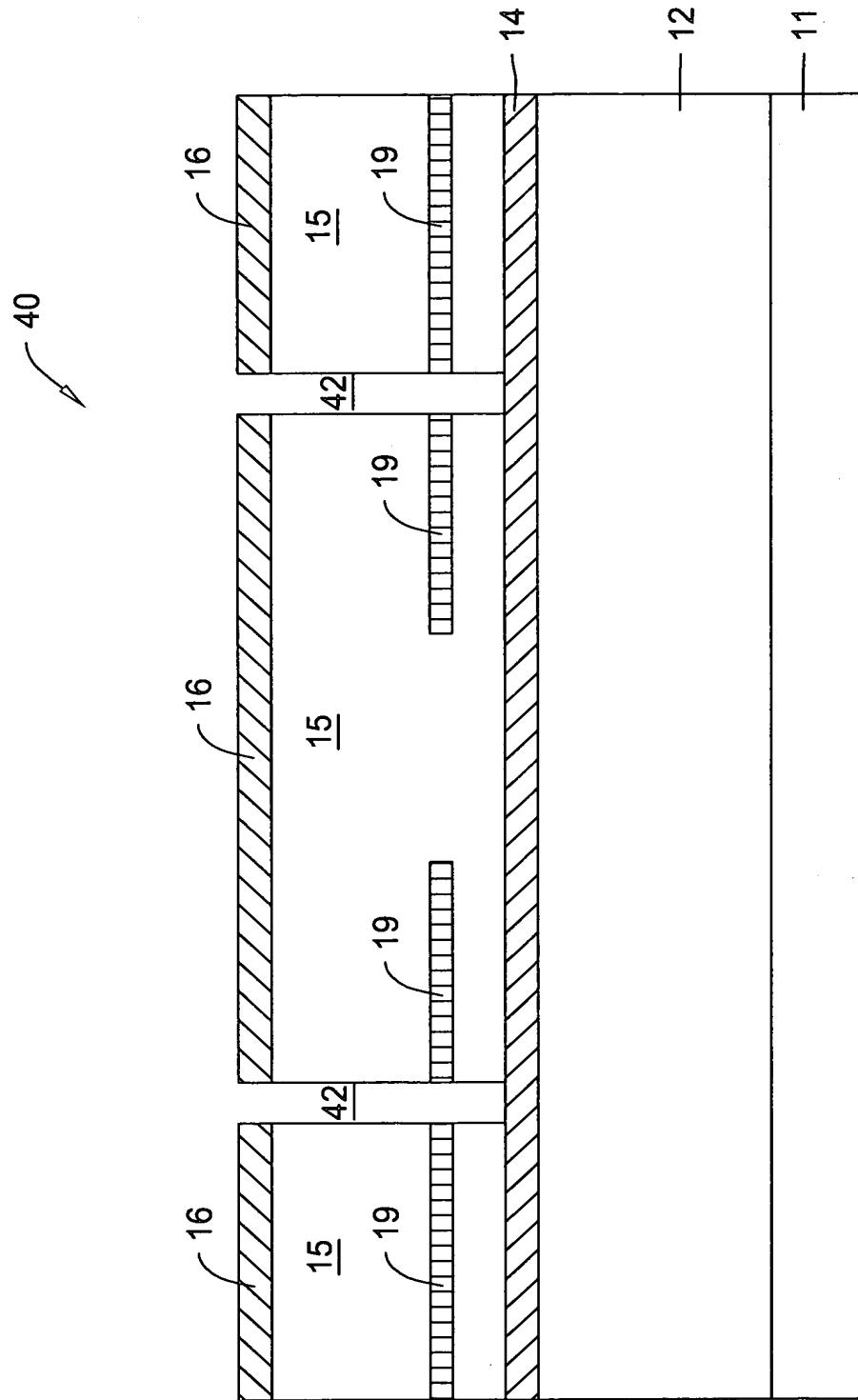


Figure 39

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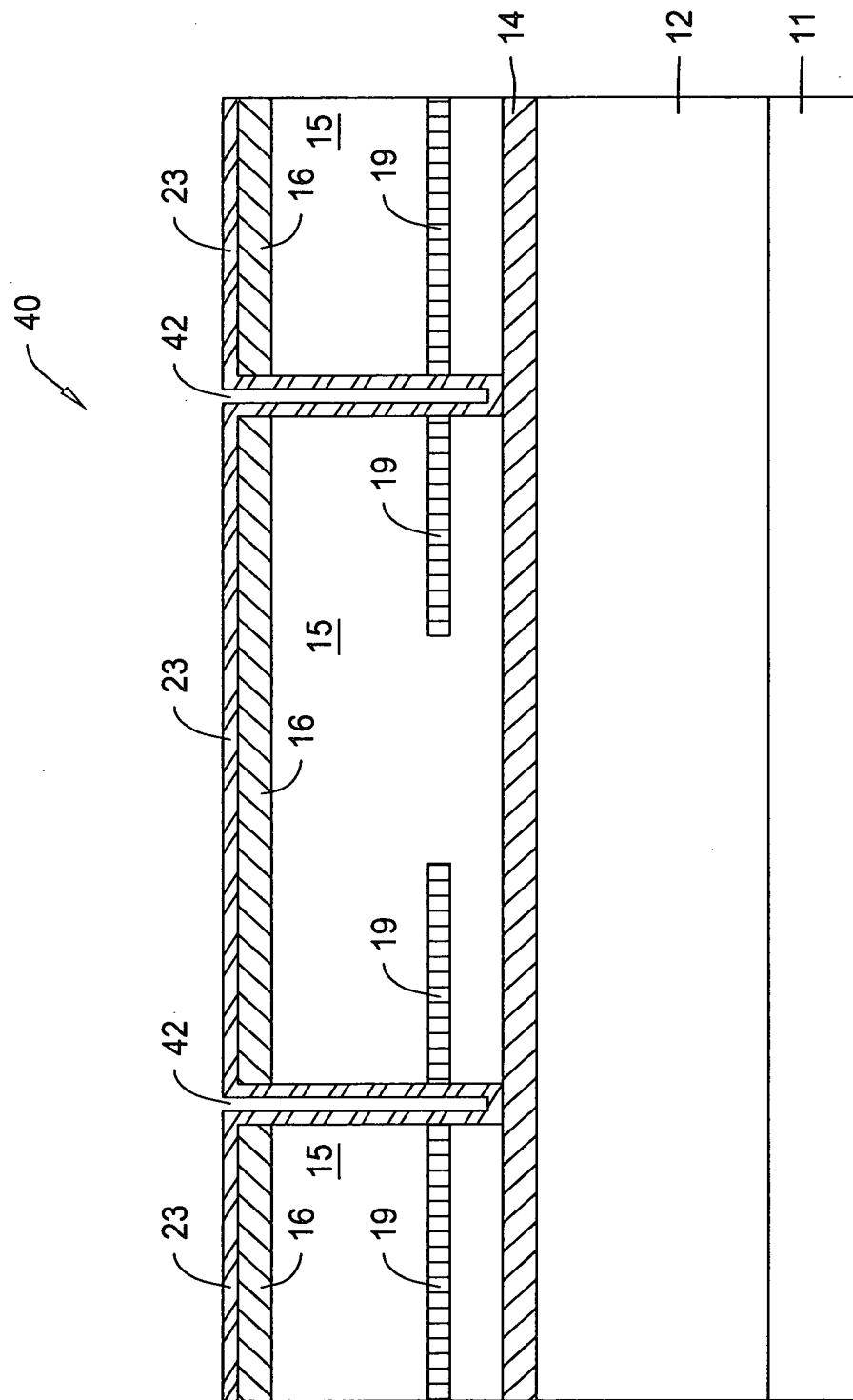


Figure 40

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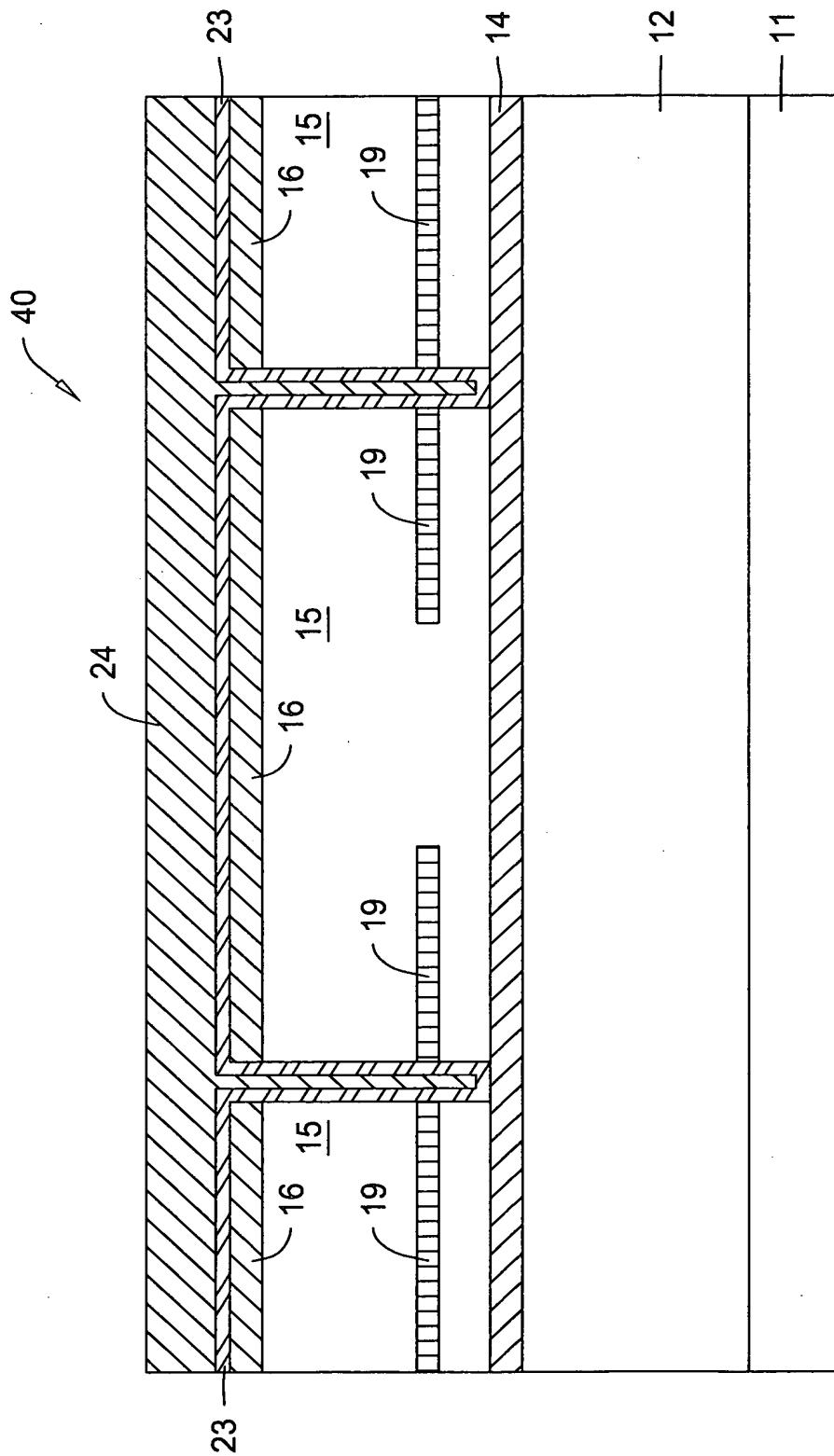


Figure 41

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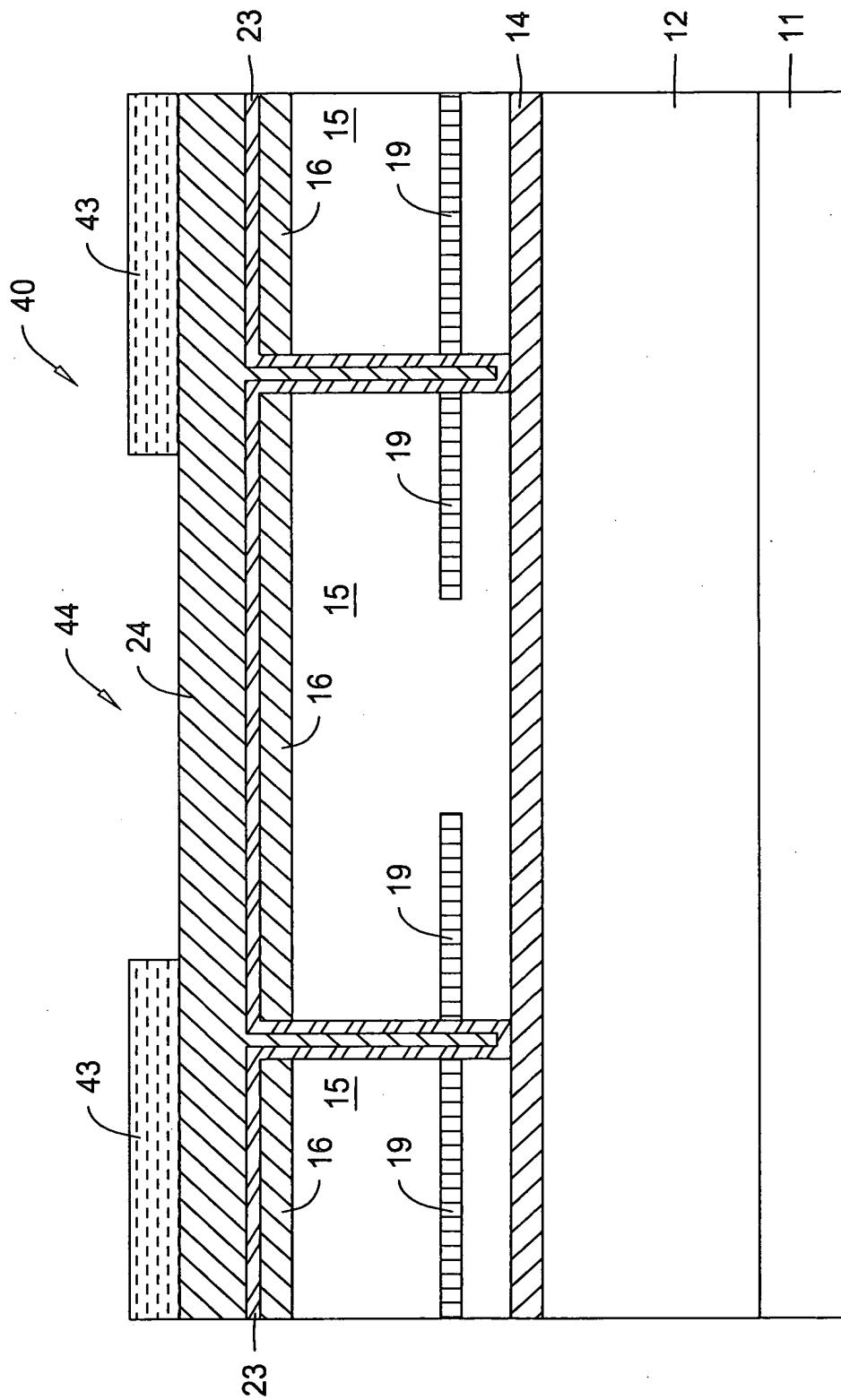


Figure 42

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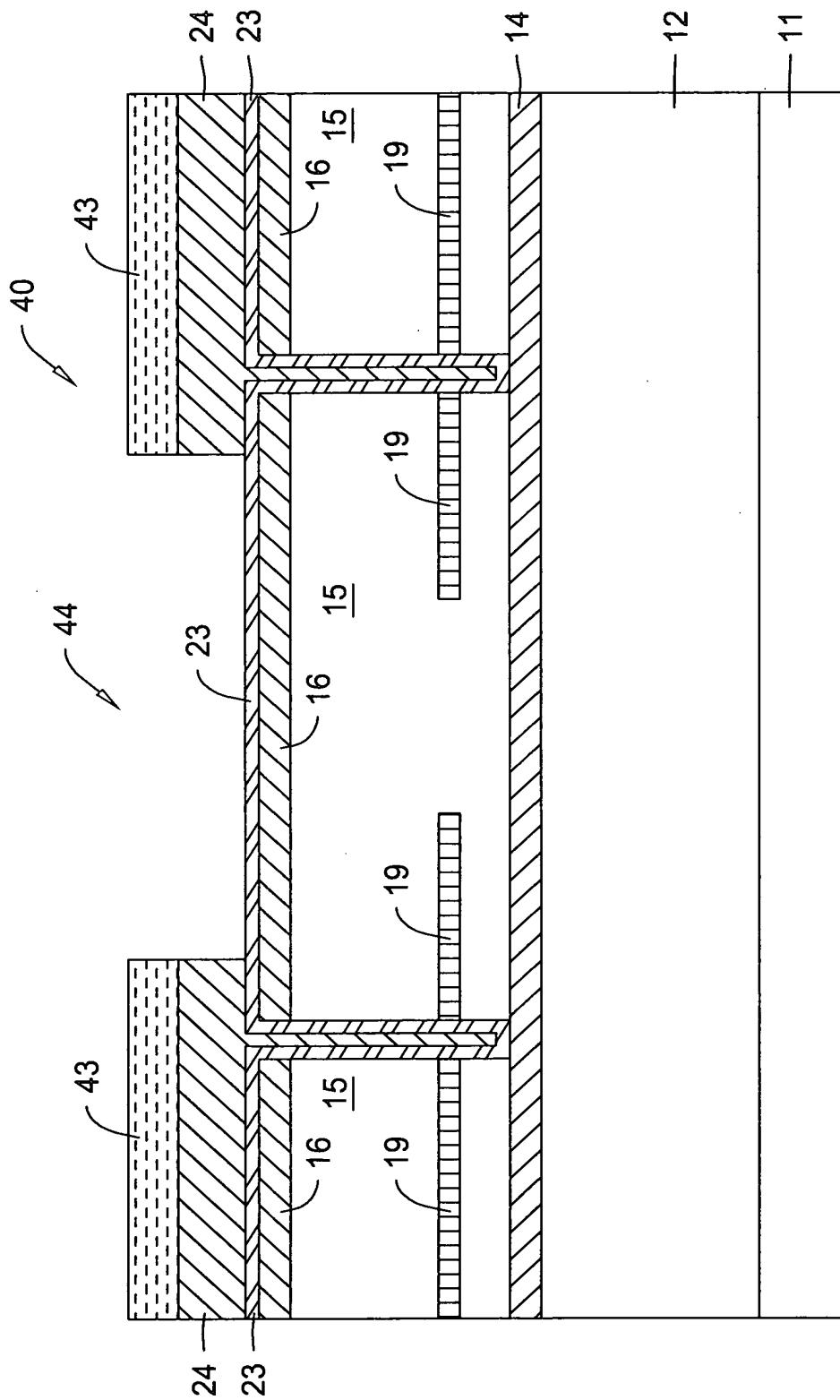


Figure 43

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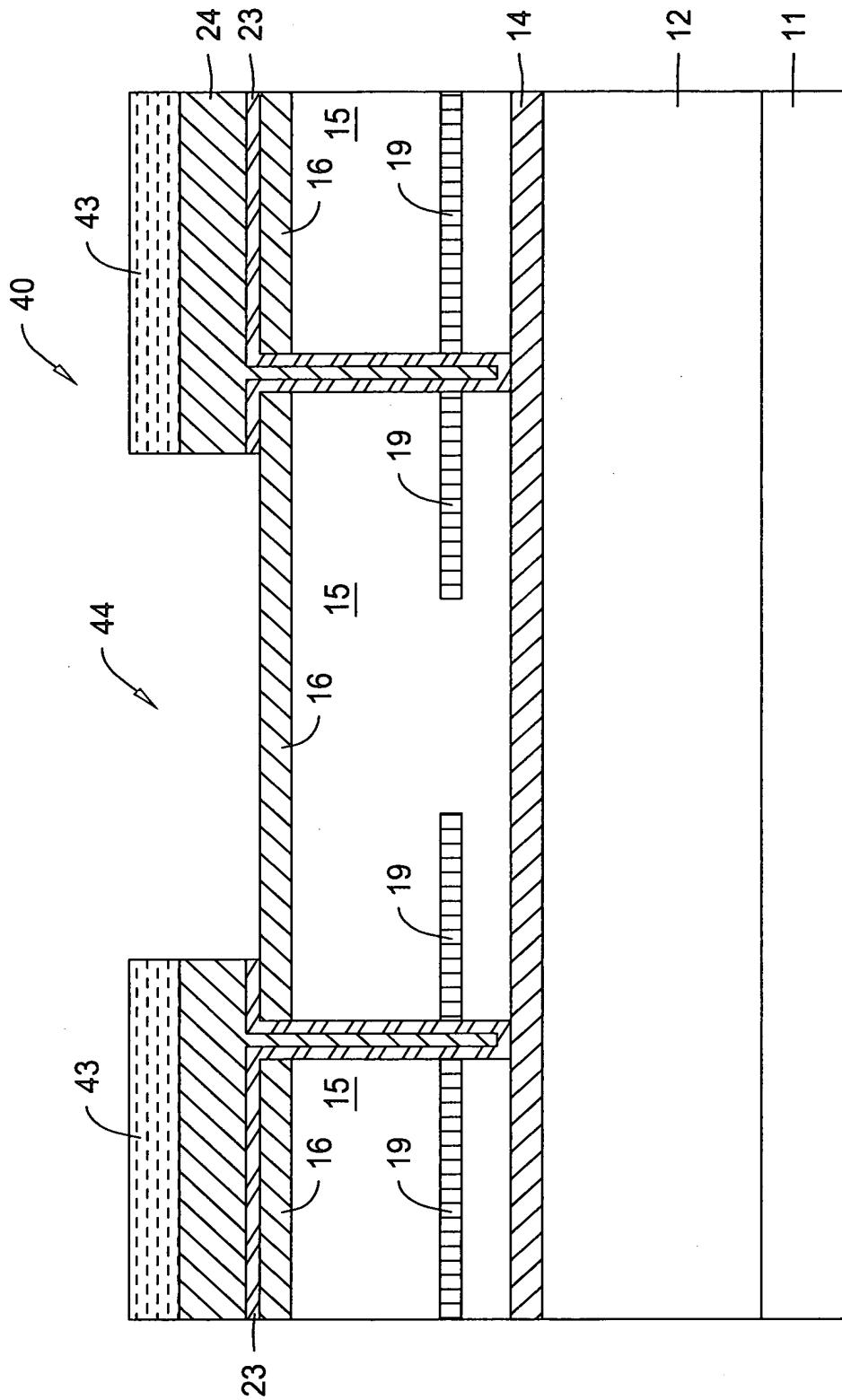


Figure 44

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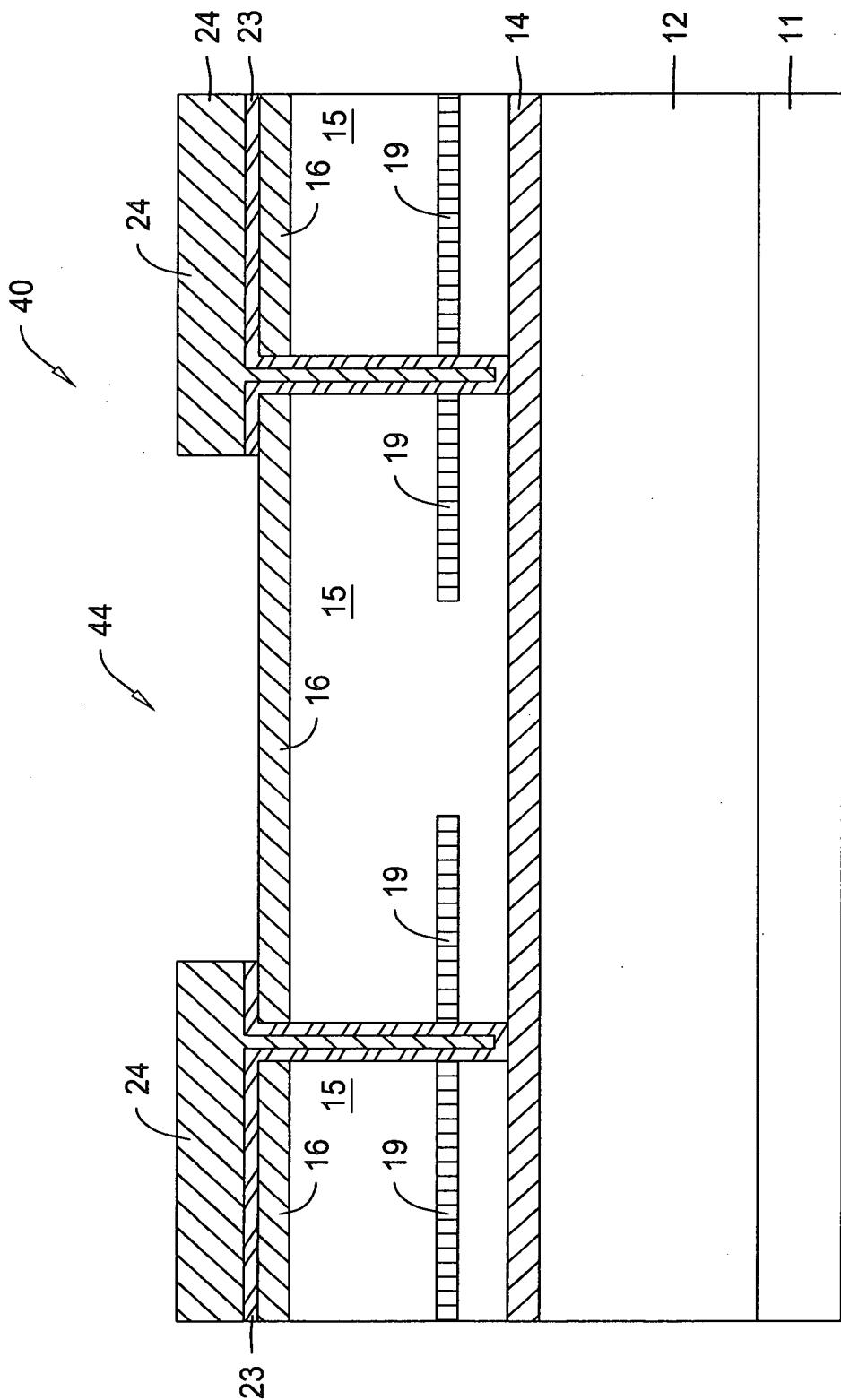


Figure 45

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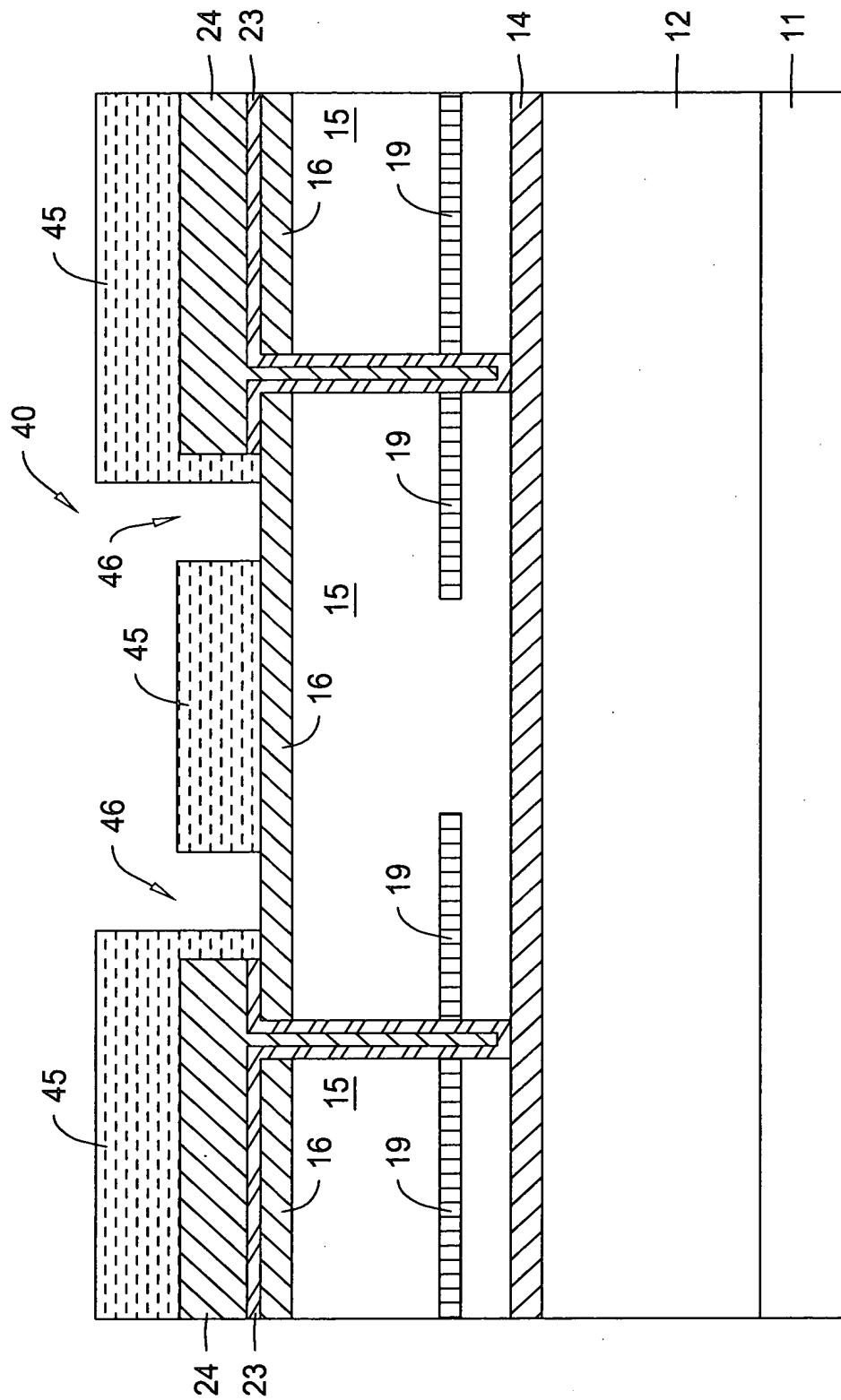


Figure 46

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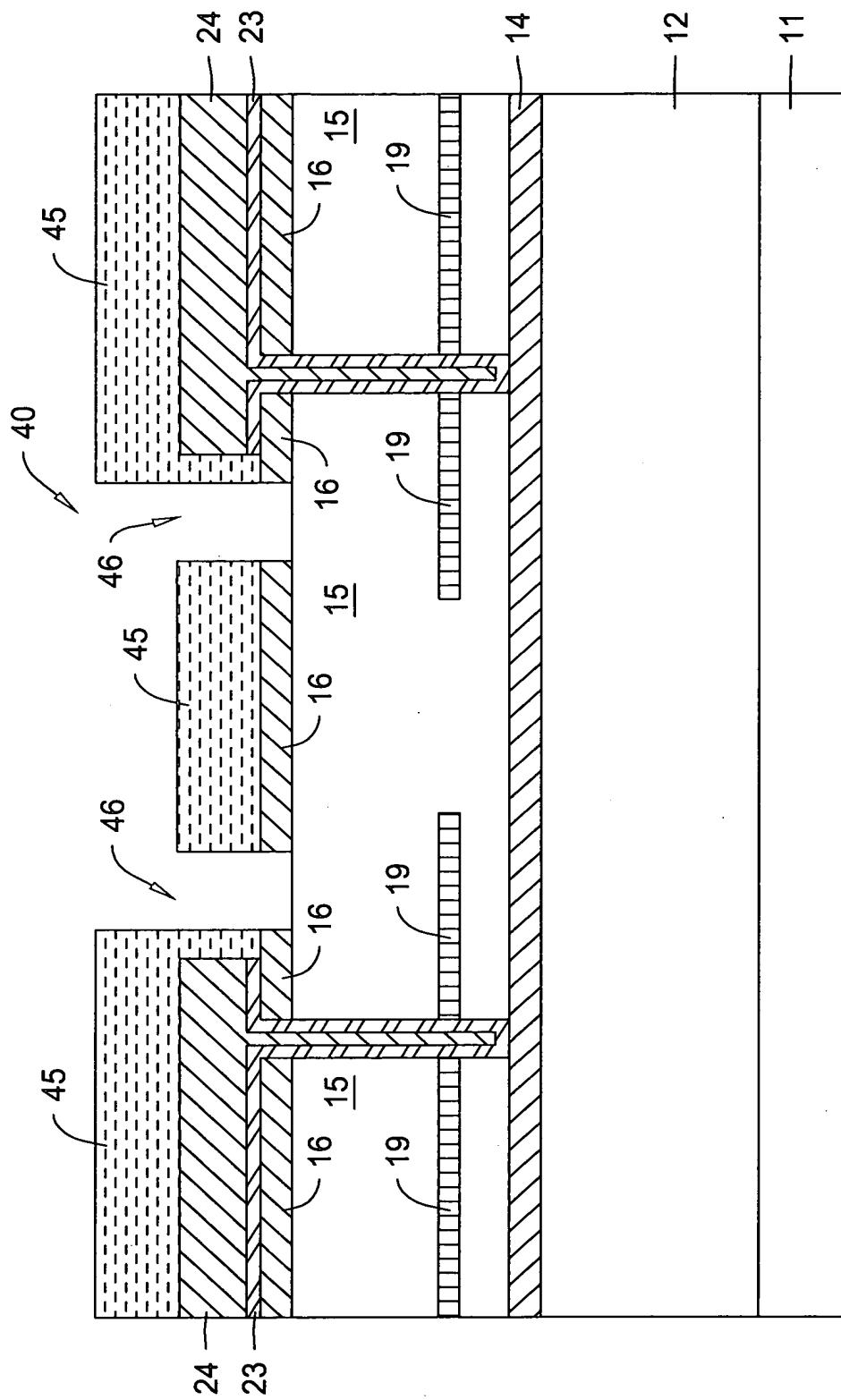


Figure 47

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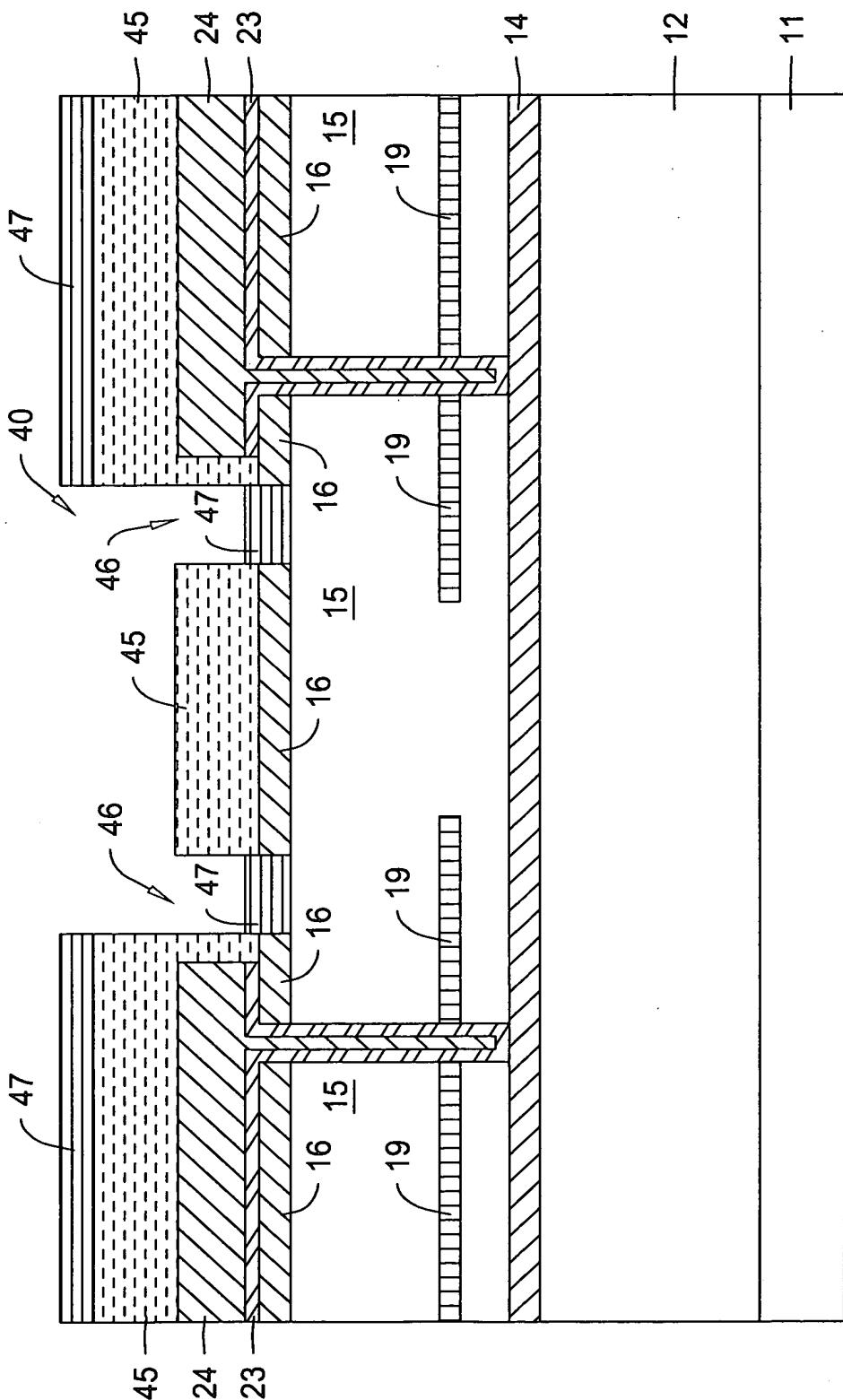


Figure 48

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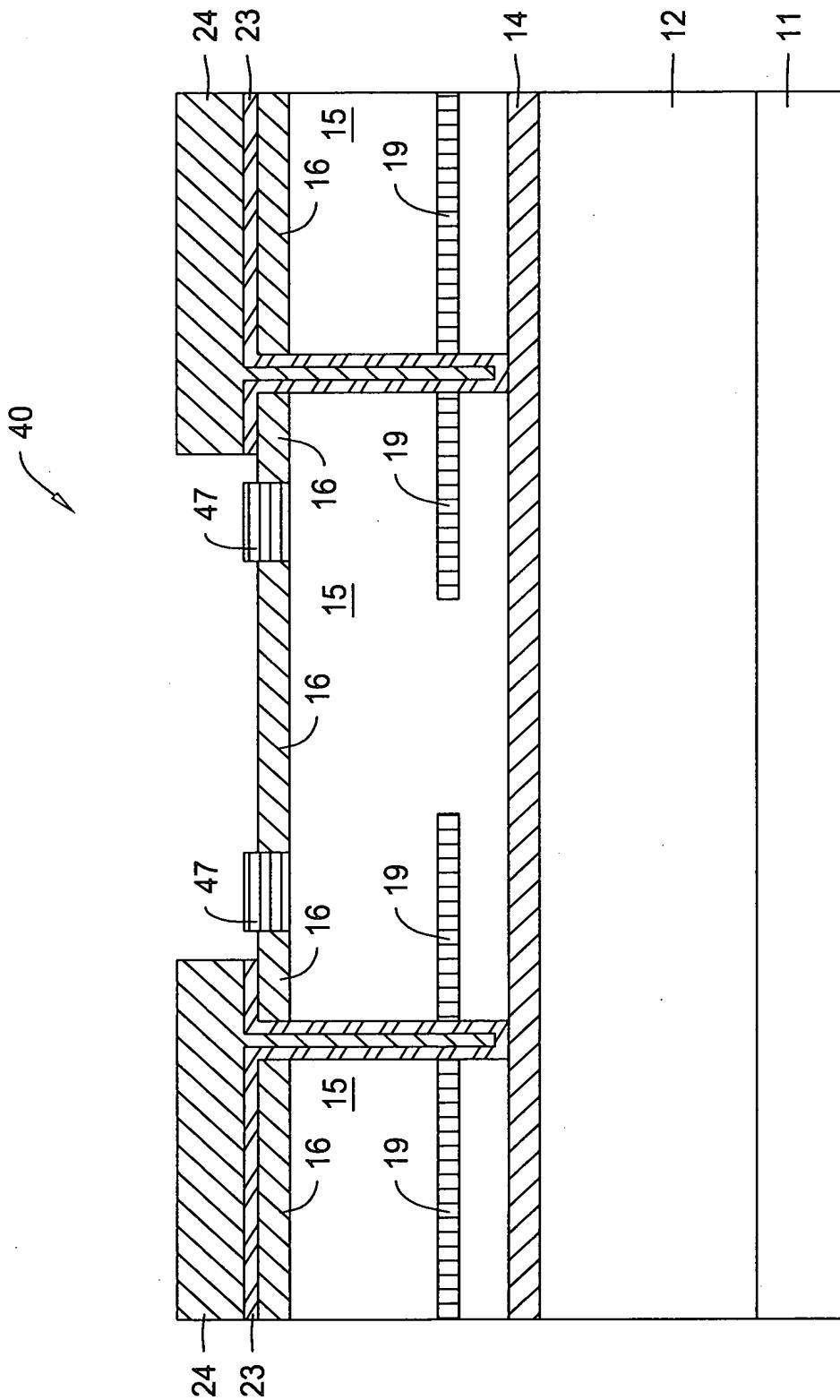


Figure 49

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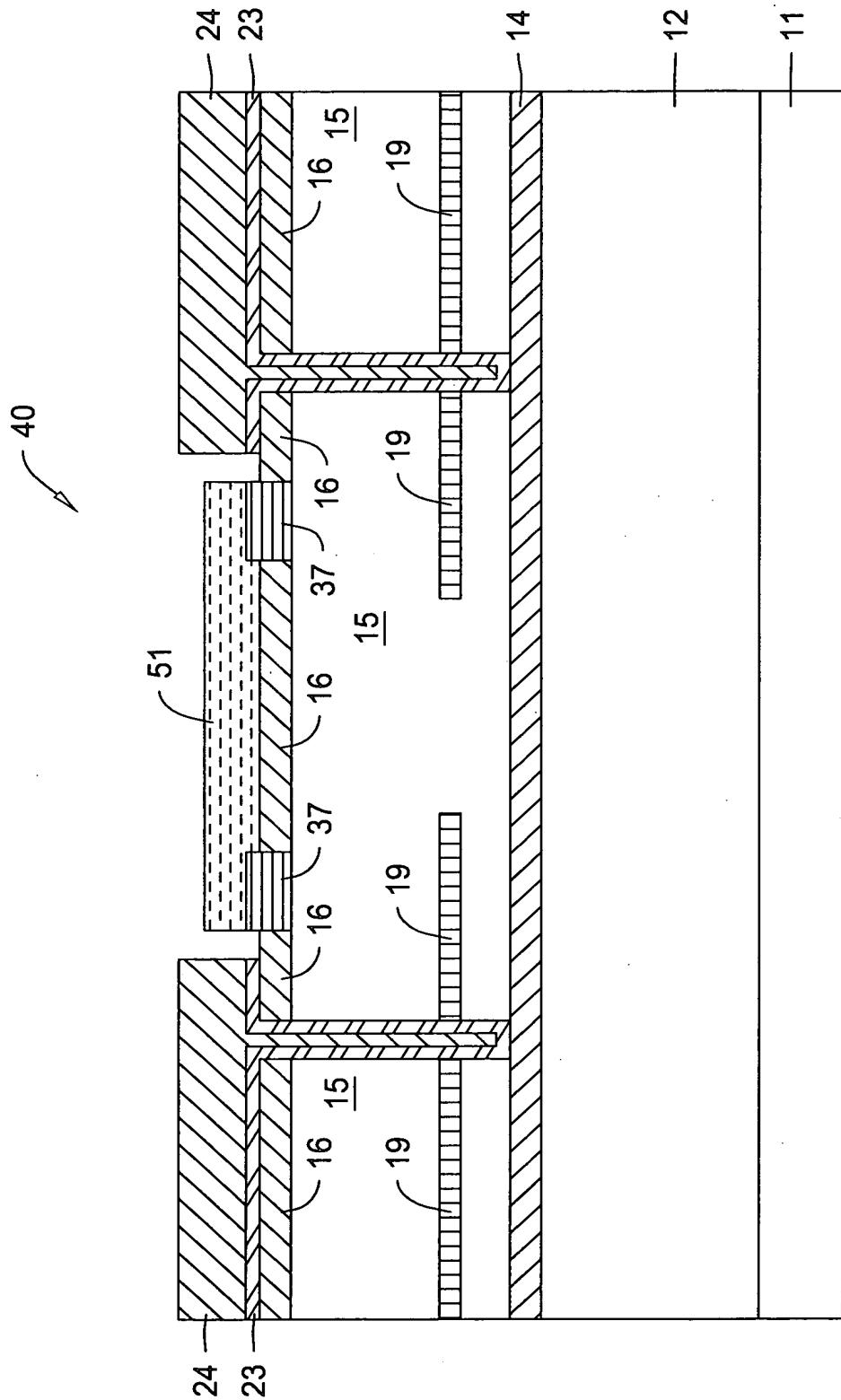


Figure 50

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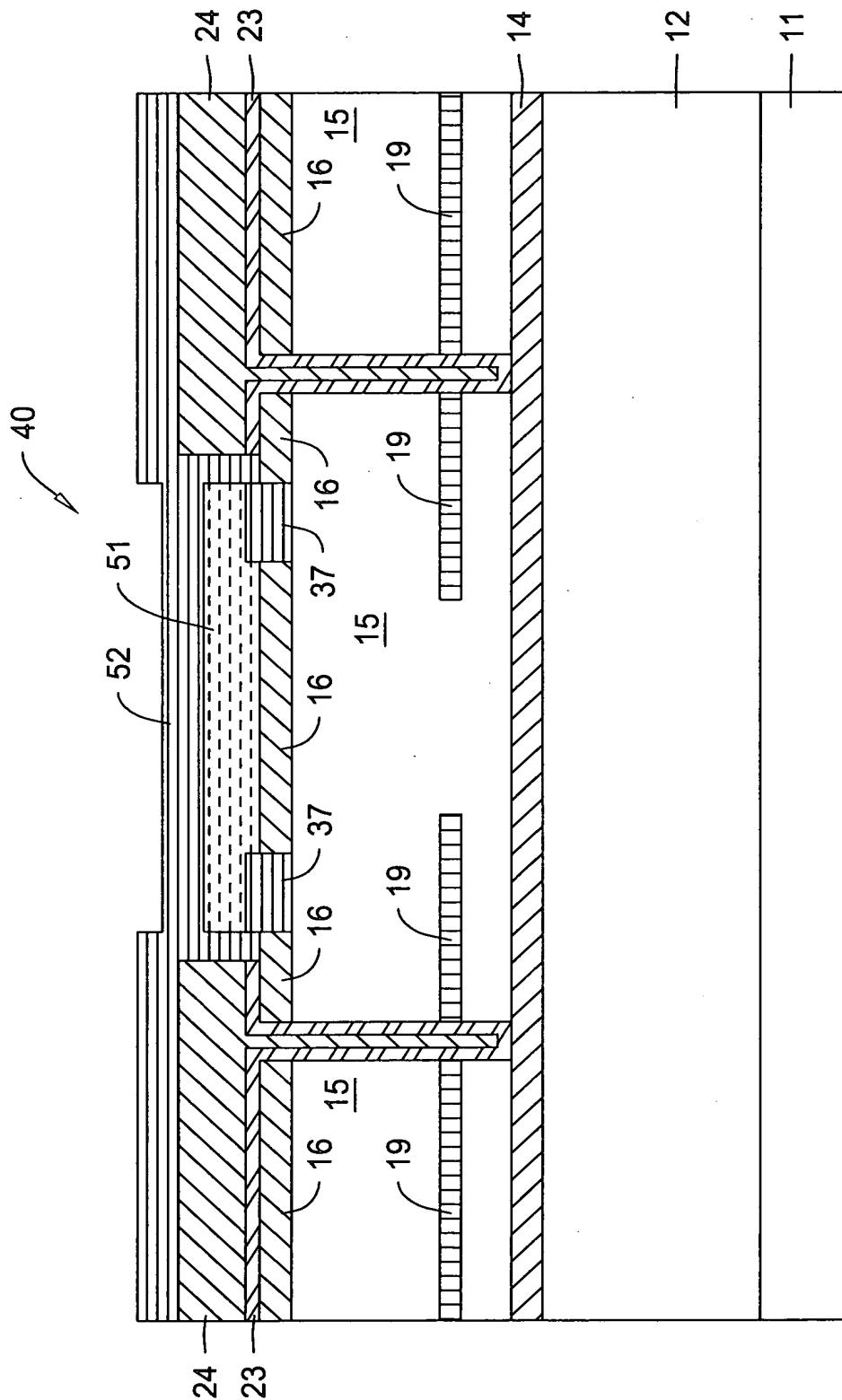


Figure 51

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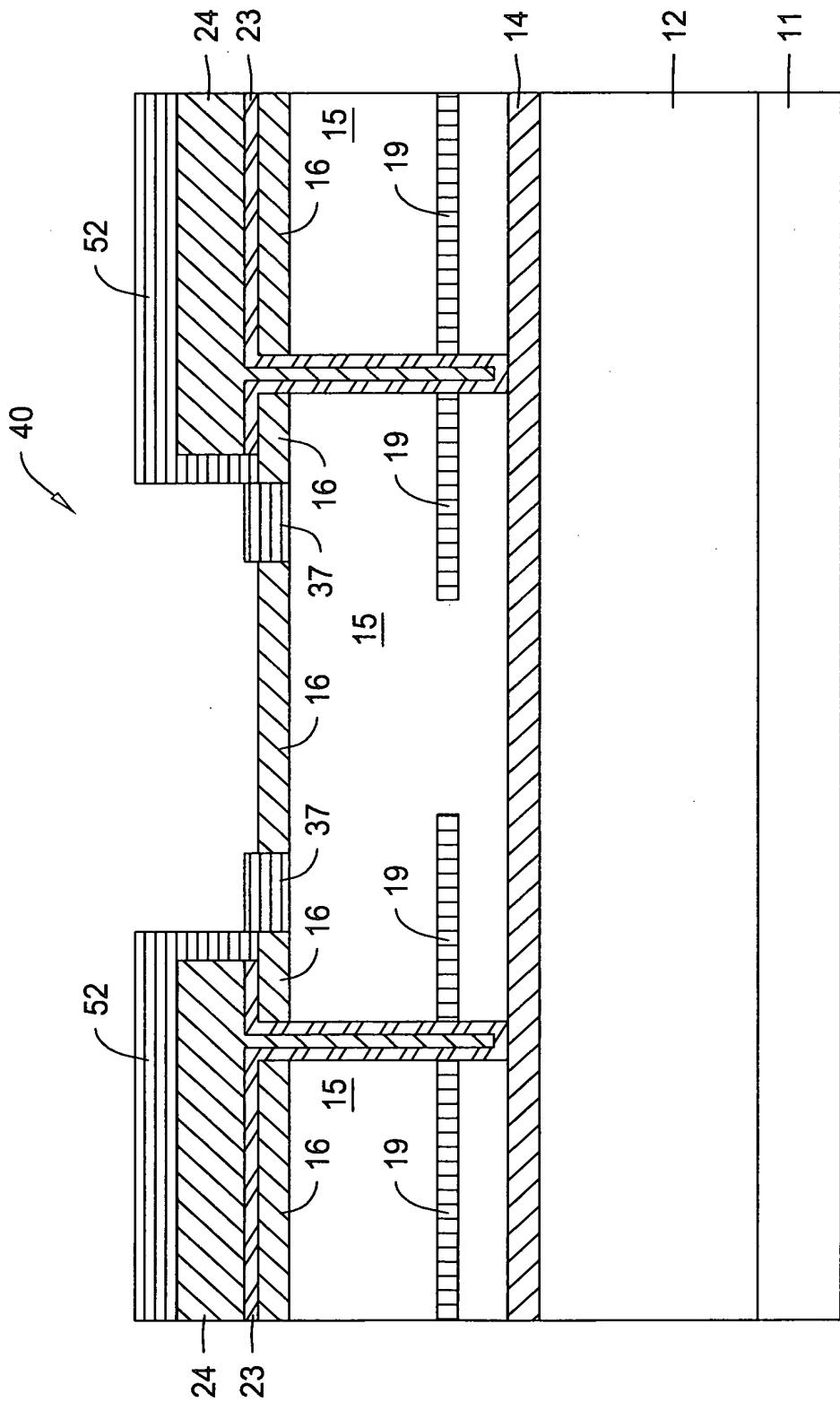


Figure 52

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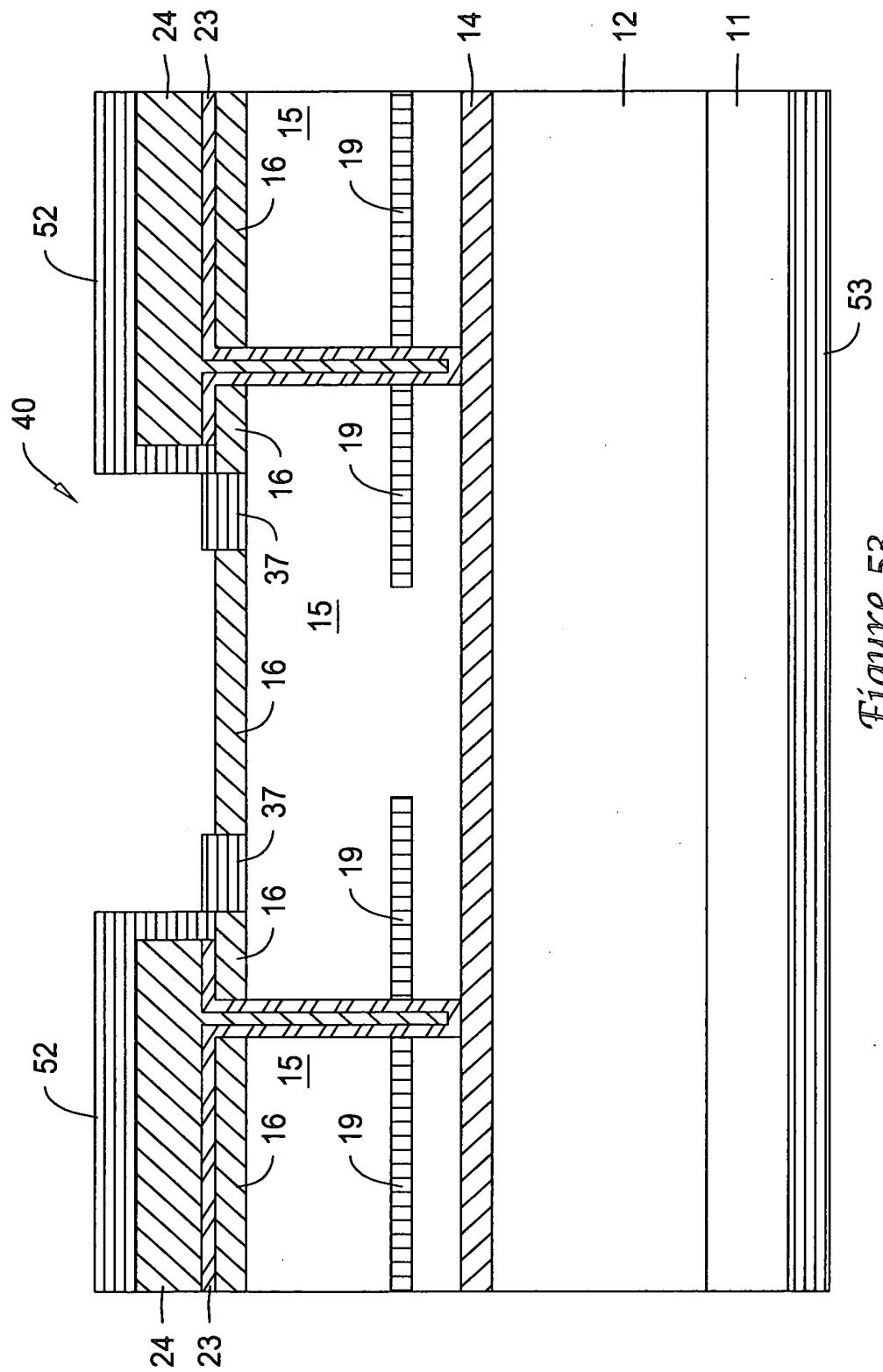


Figure 53

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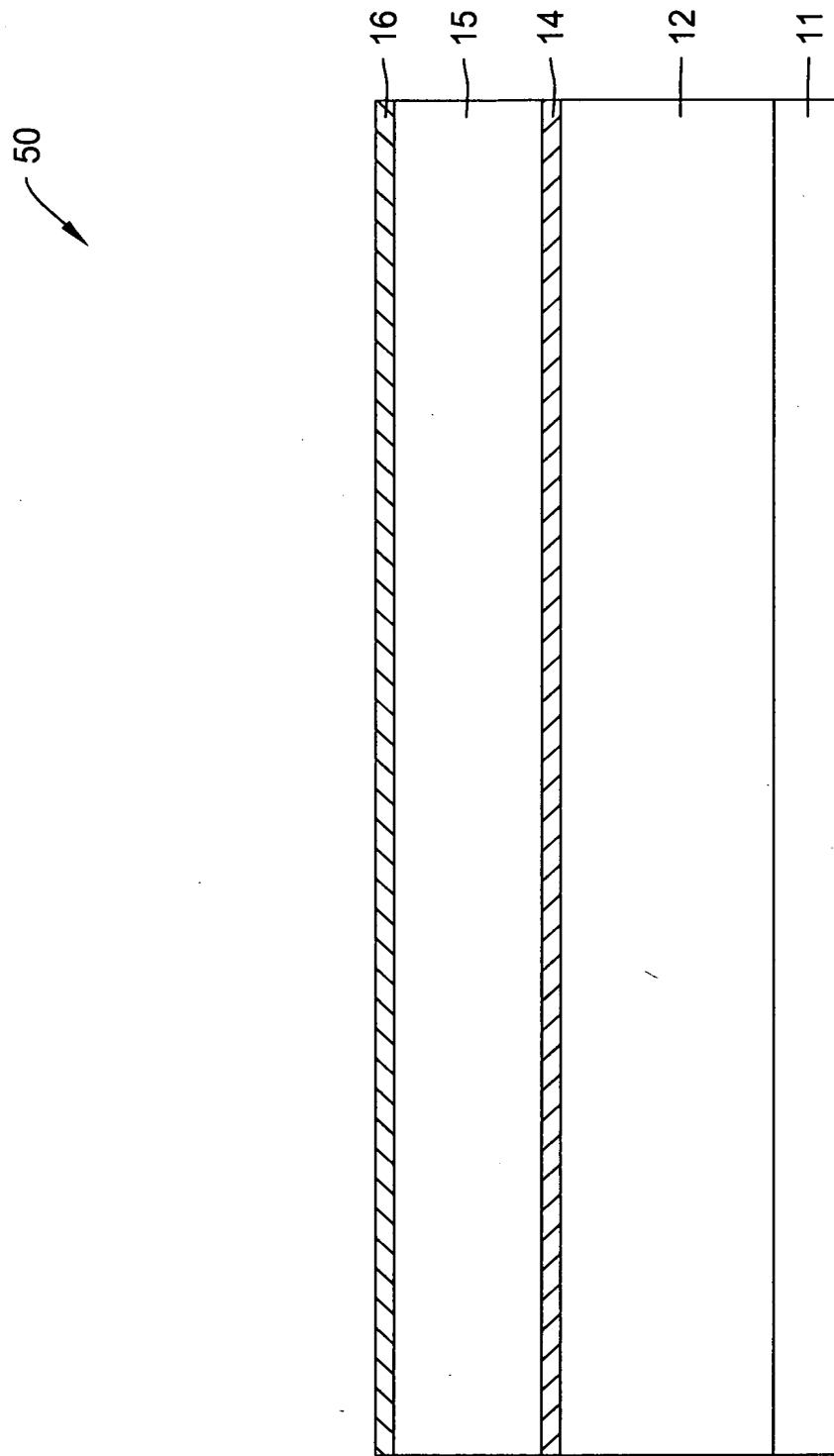


Figure 54

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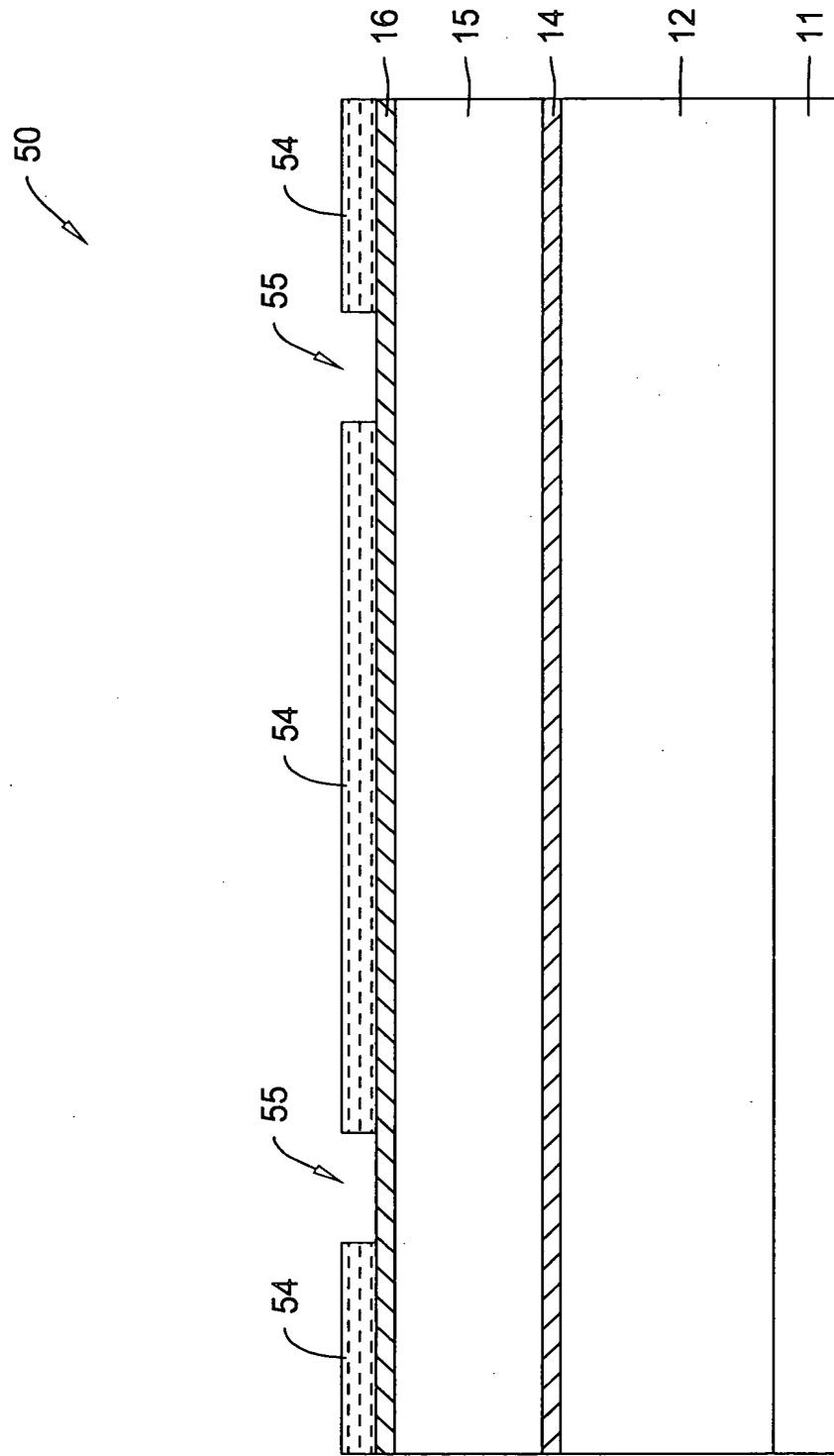


Figure 55

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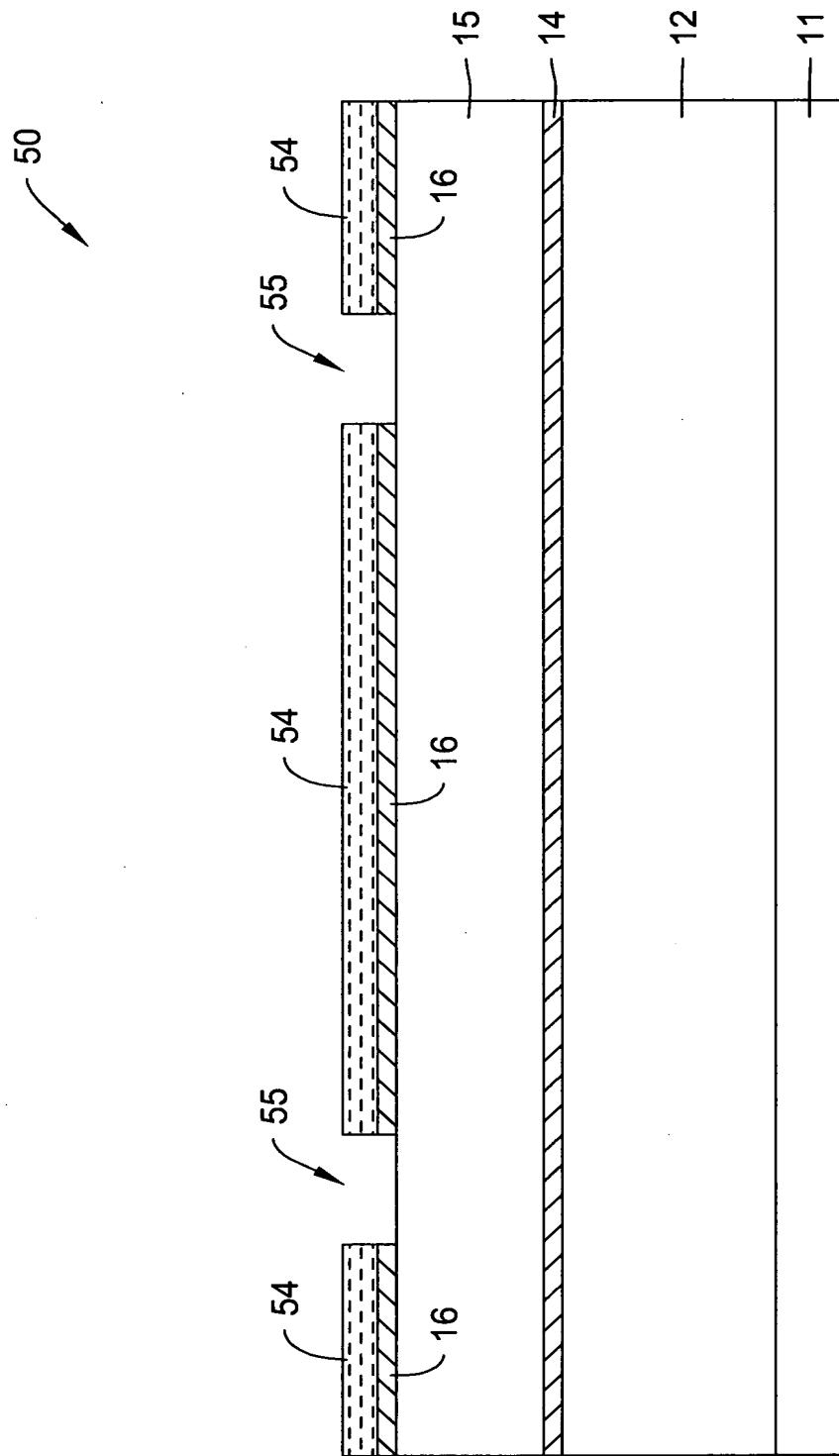


Figure 56

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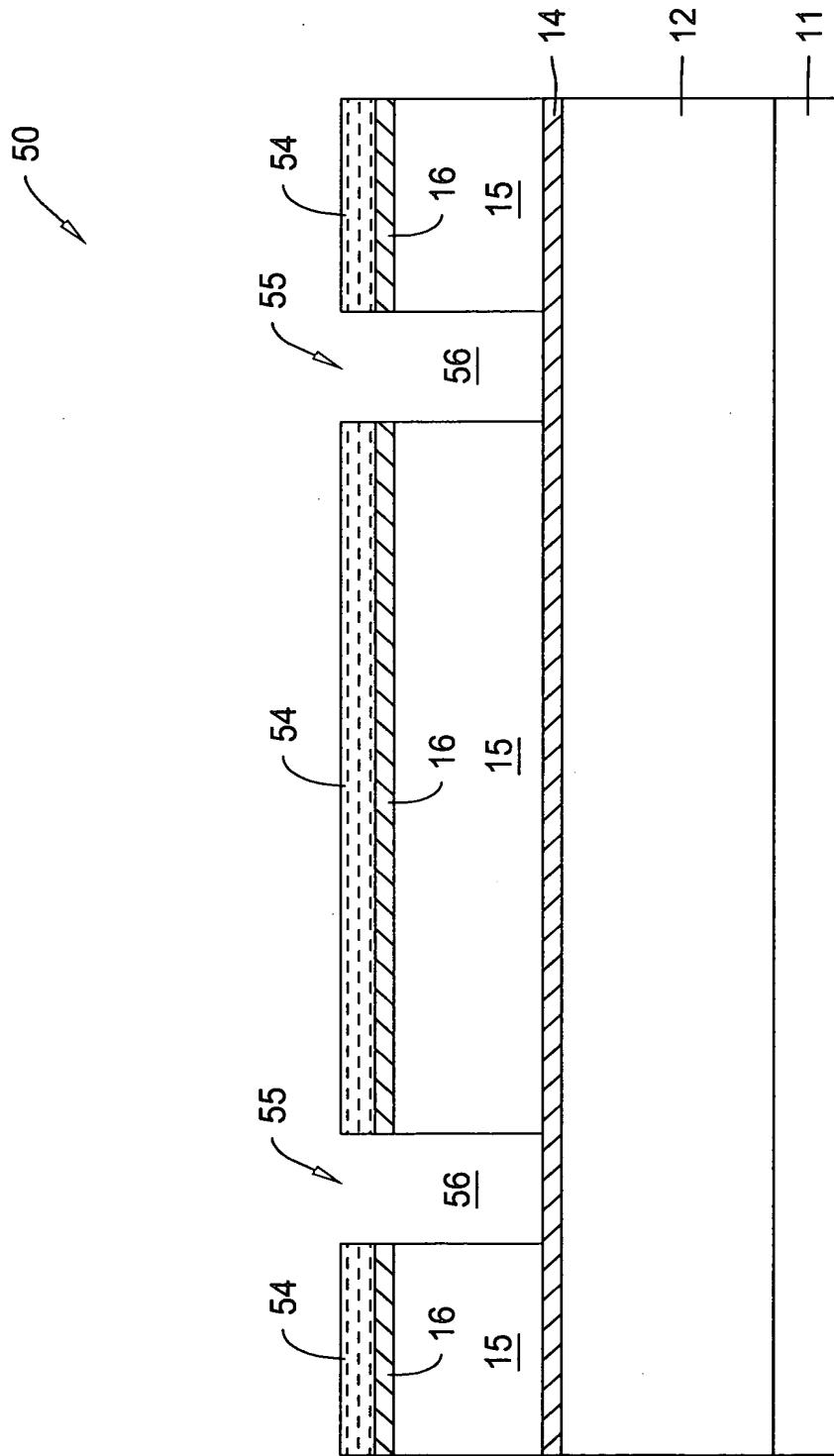


Figure 57

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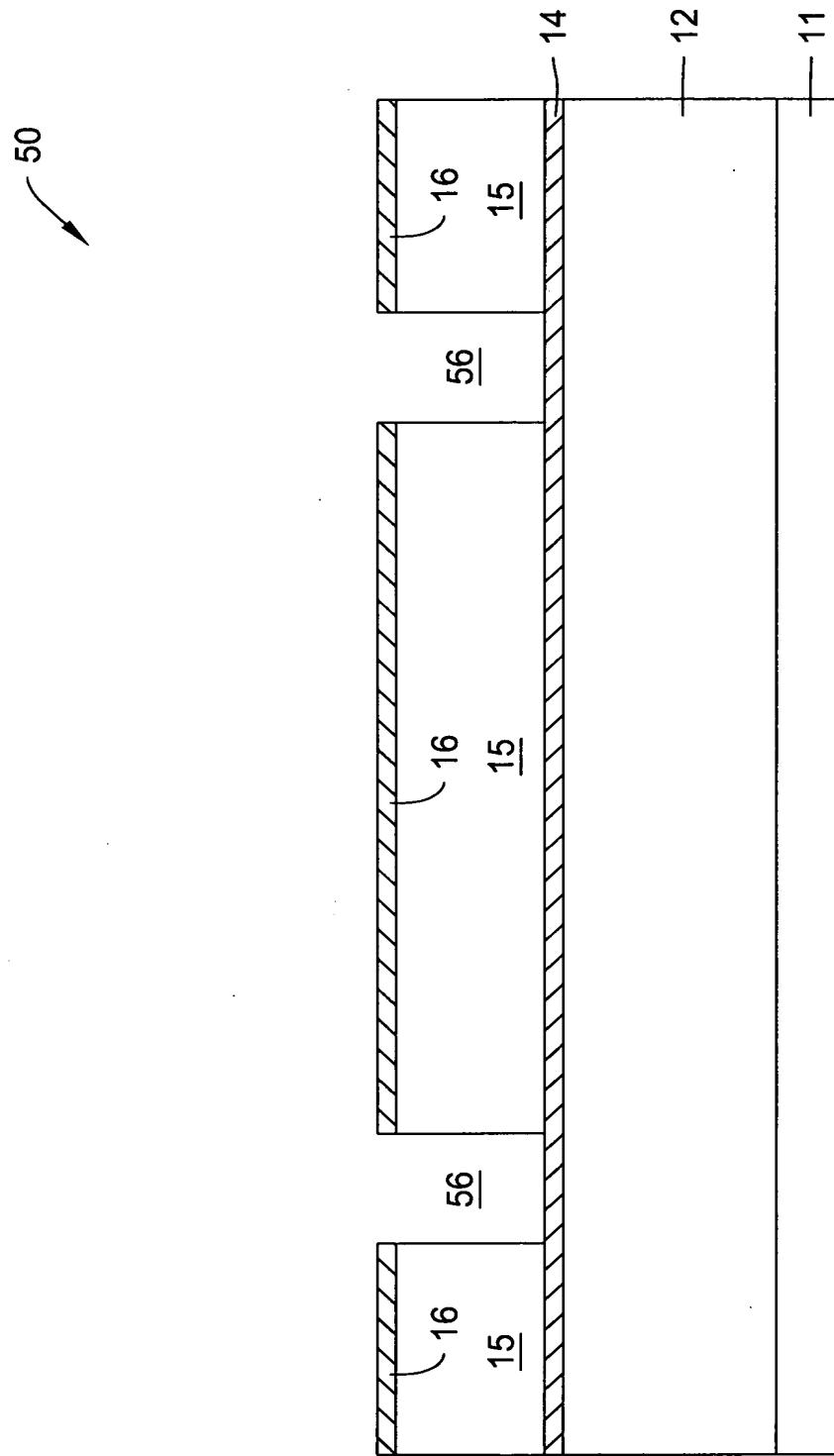


Figure 58

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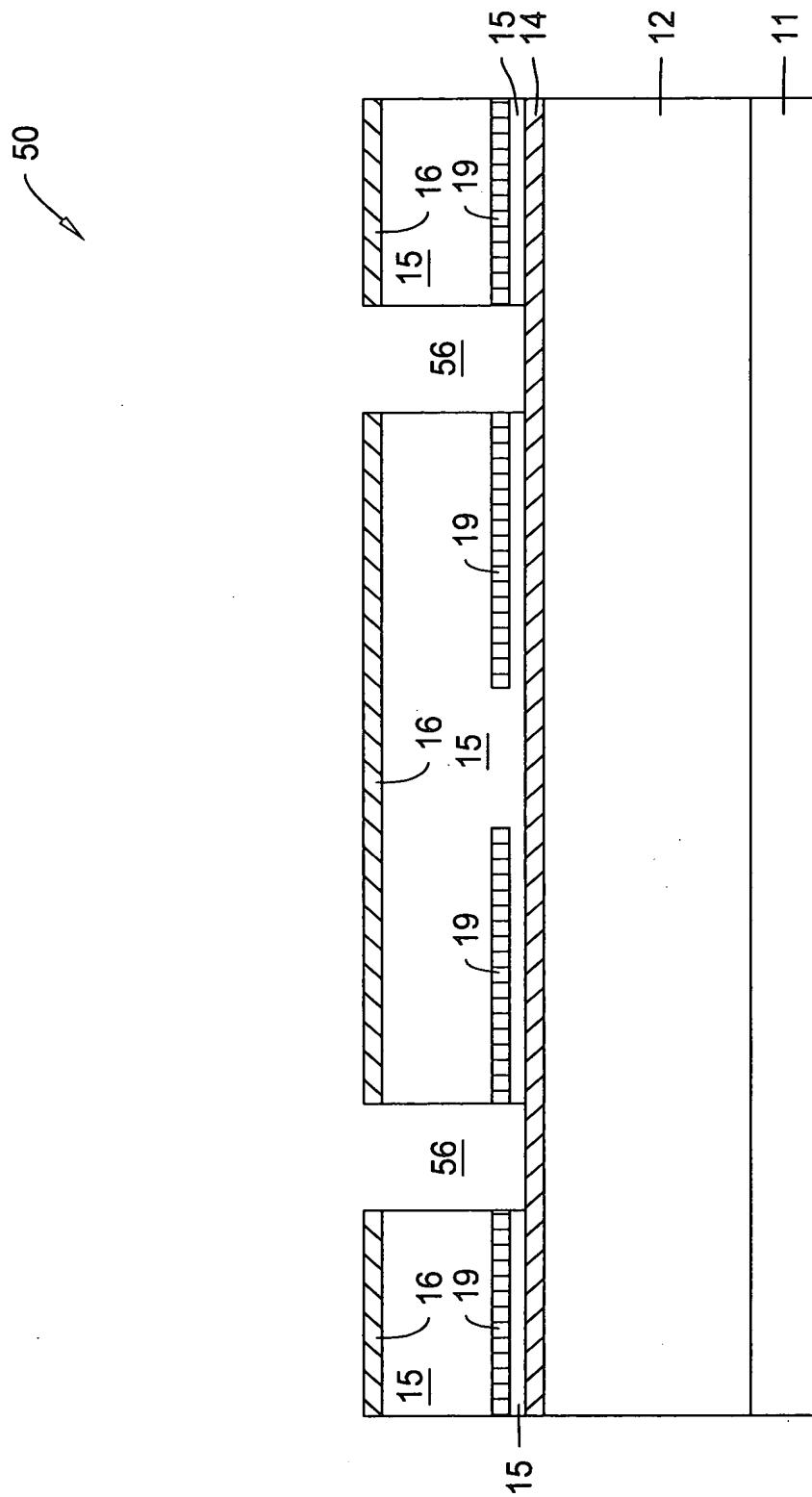


Figure 59

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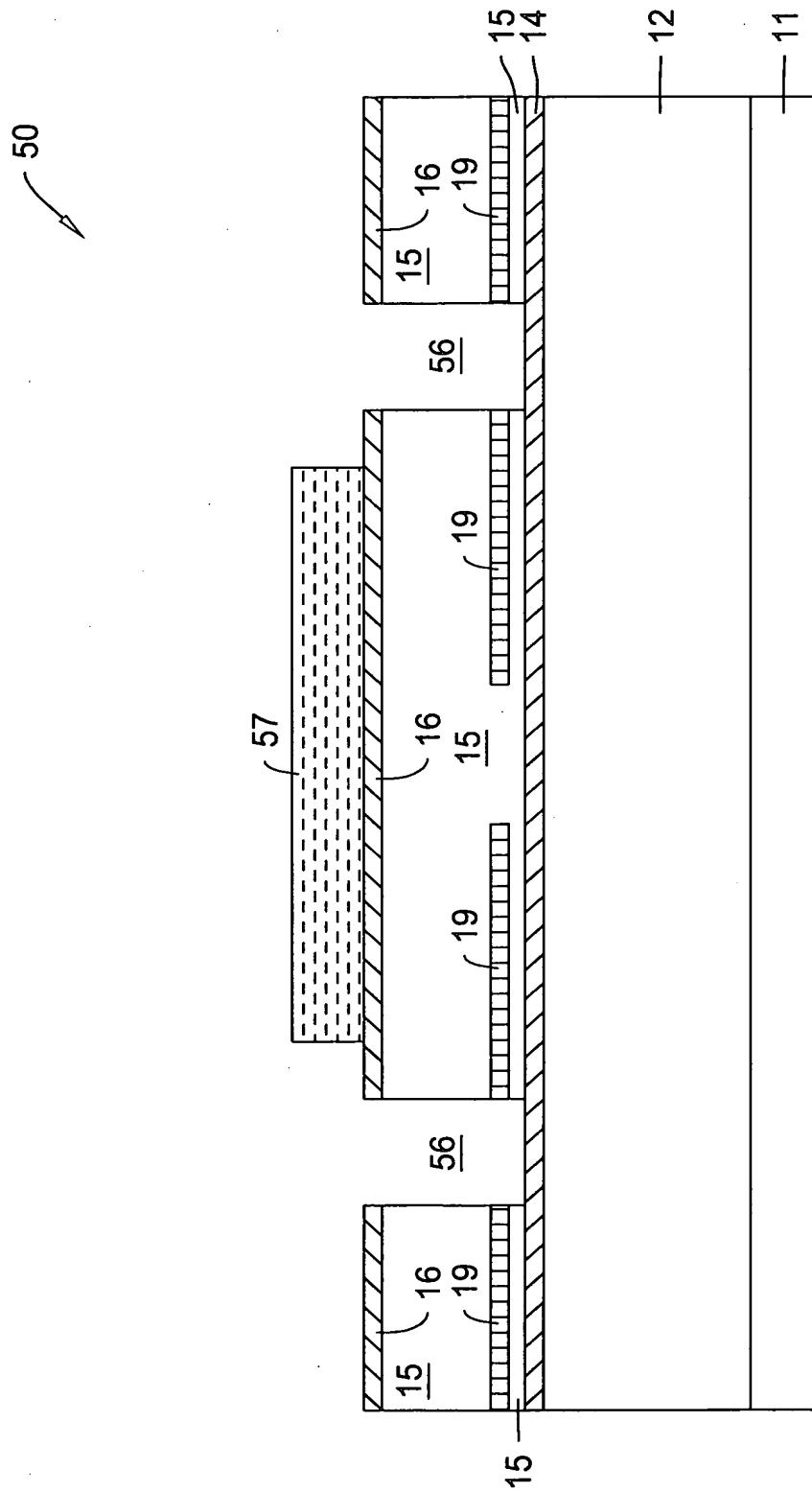


Figure 60

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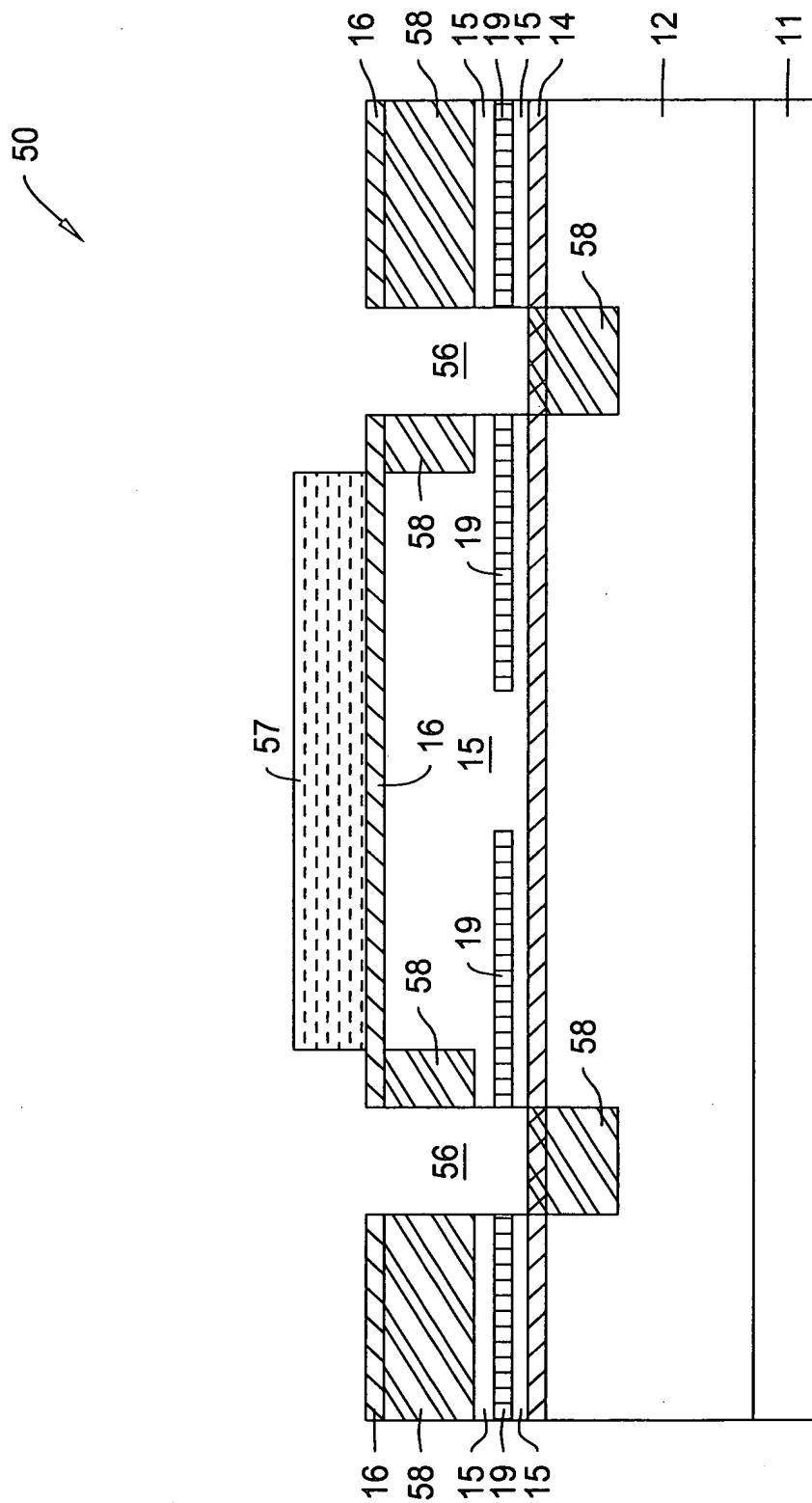


Figure 61

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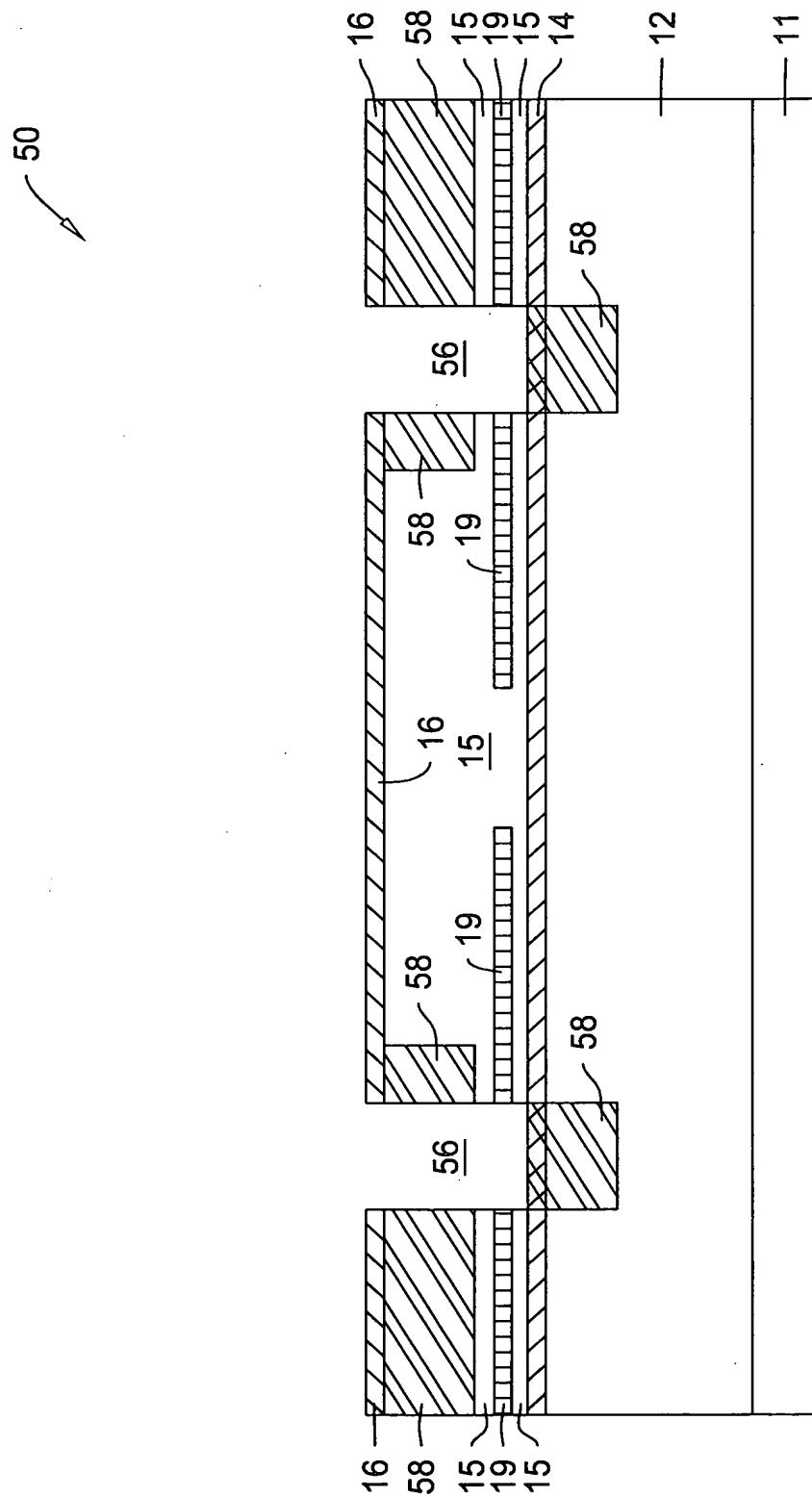


Figure 62

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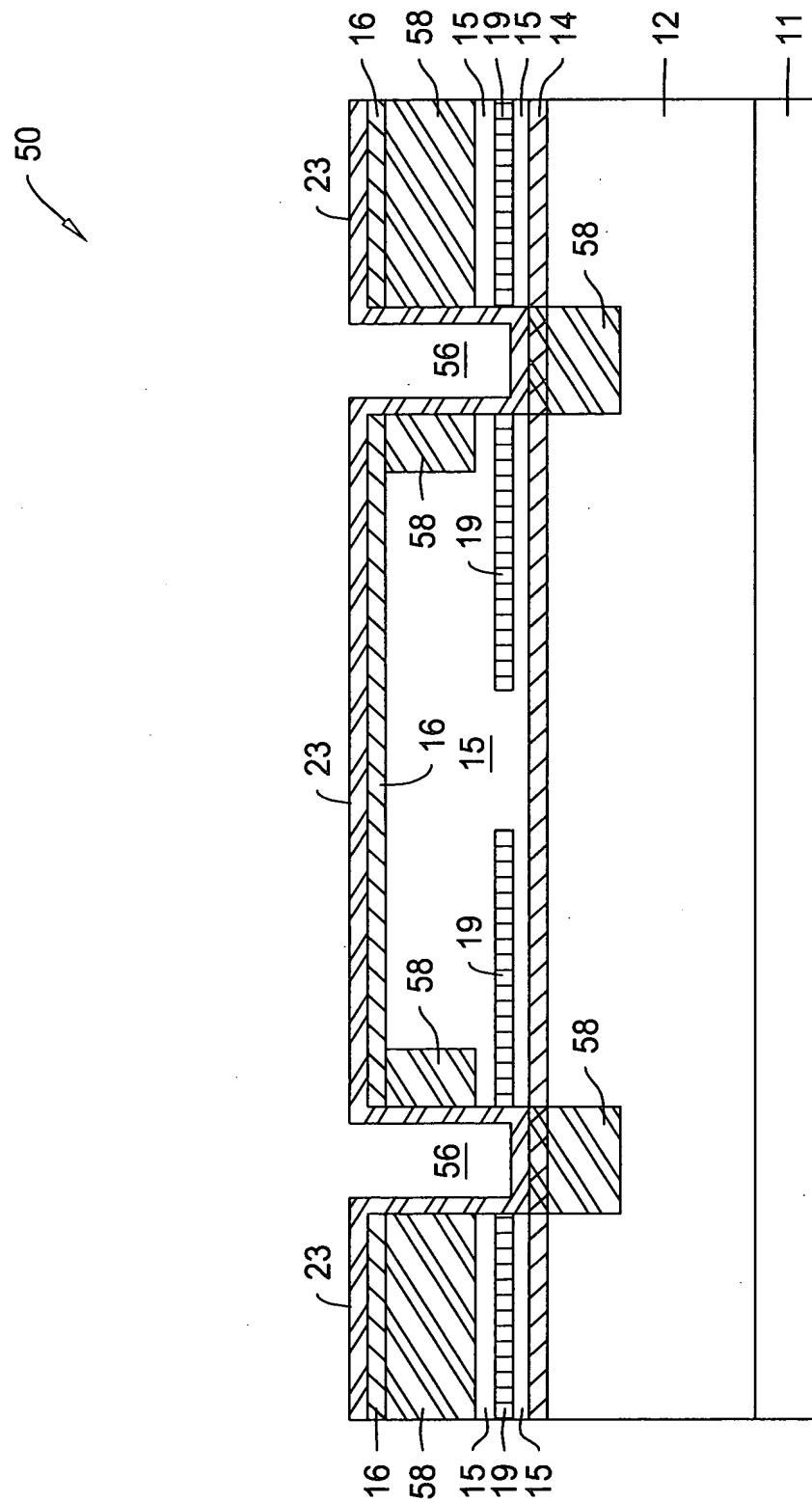


Figure 63

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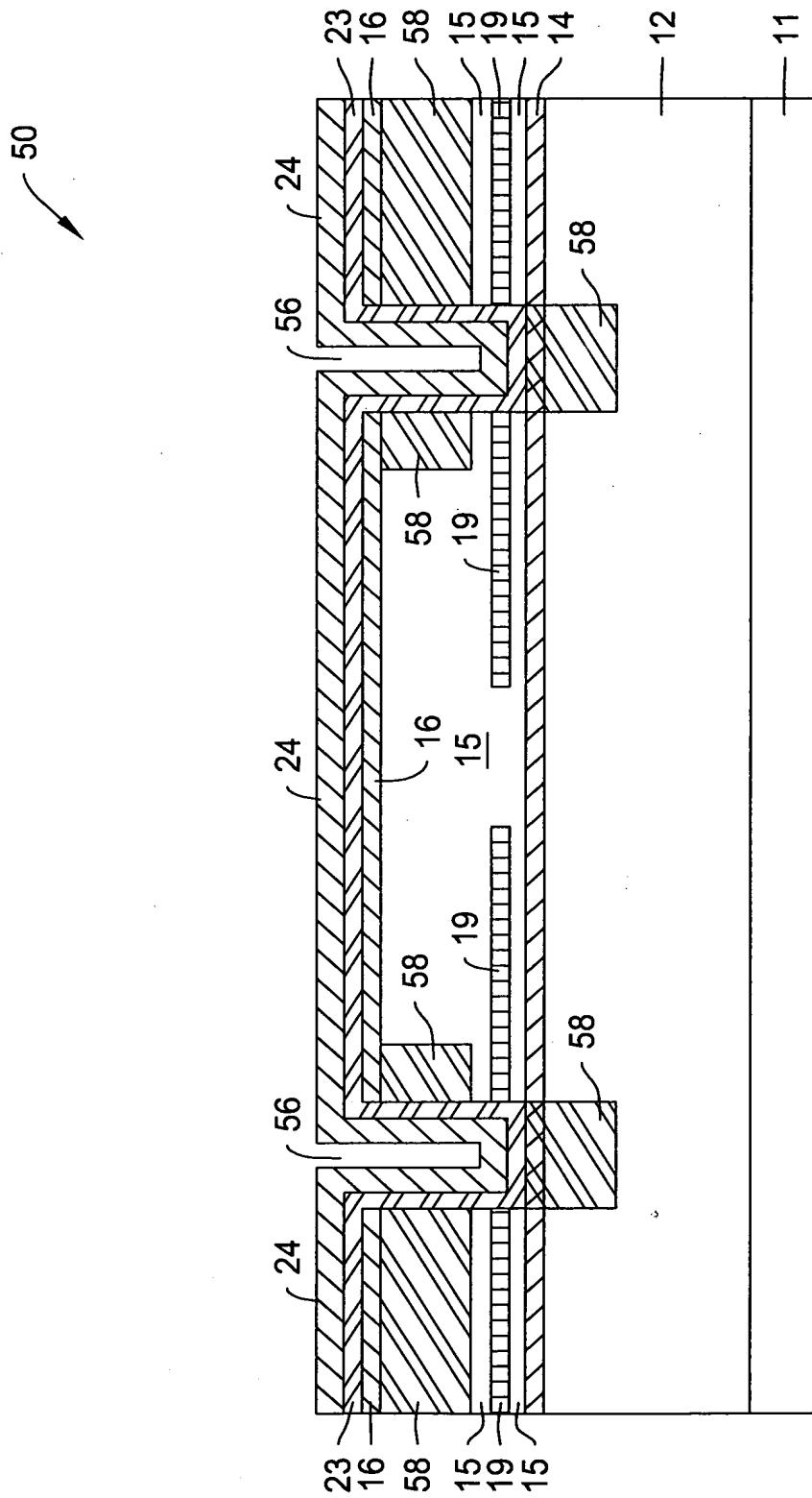


Figure 64

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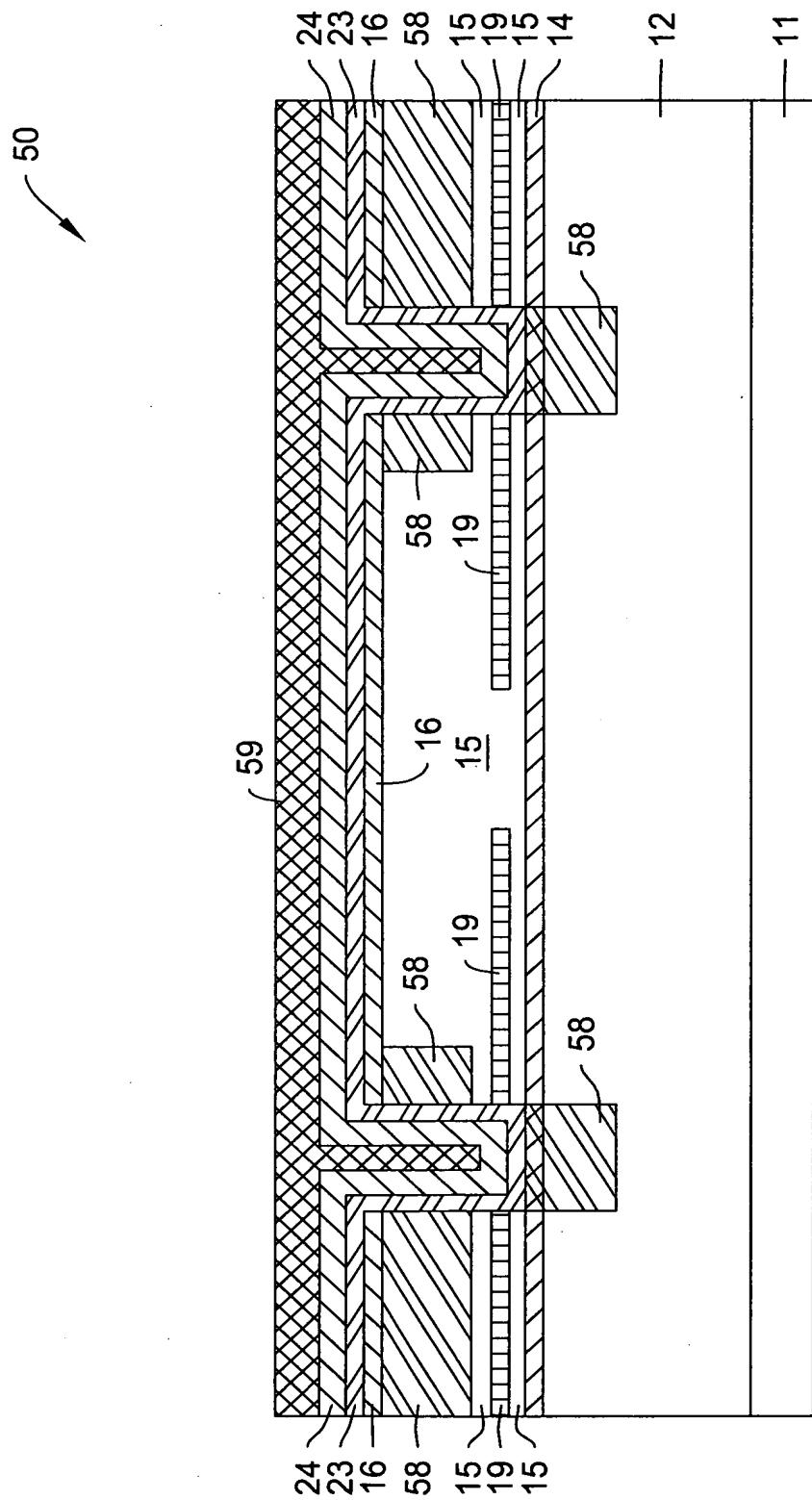


Figure 65

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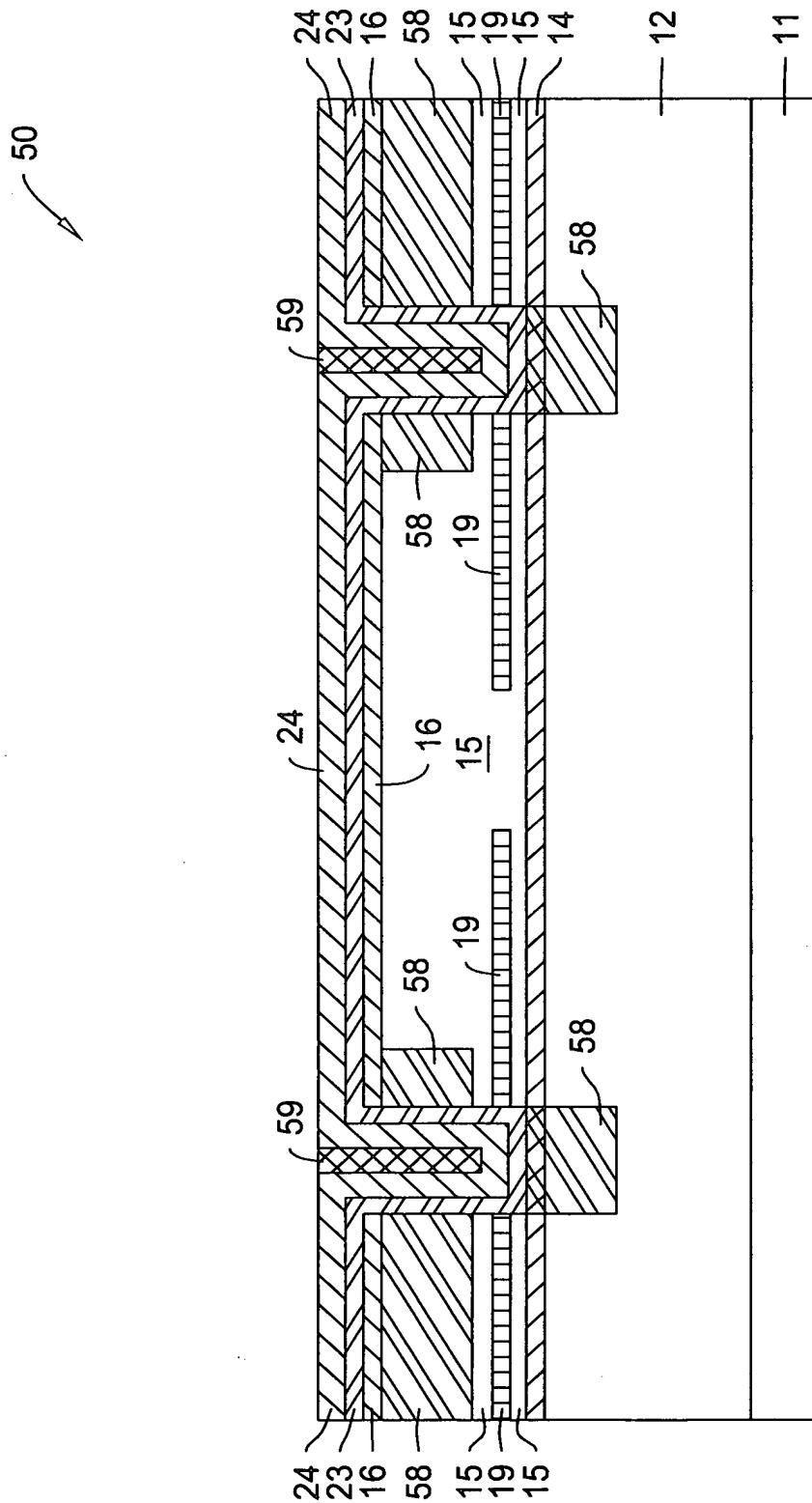


Figure 66

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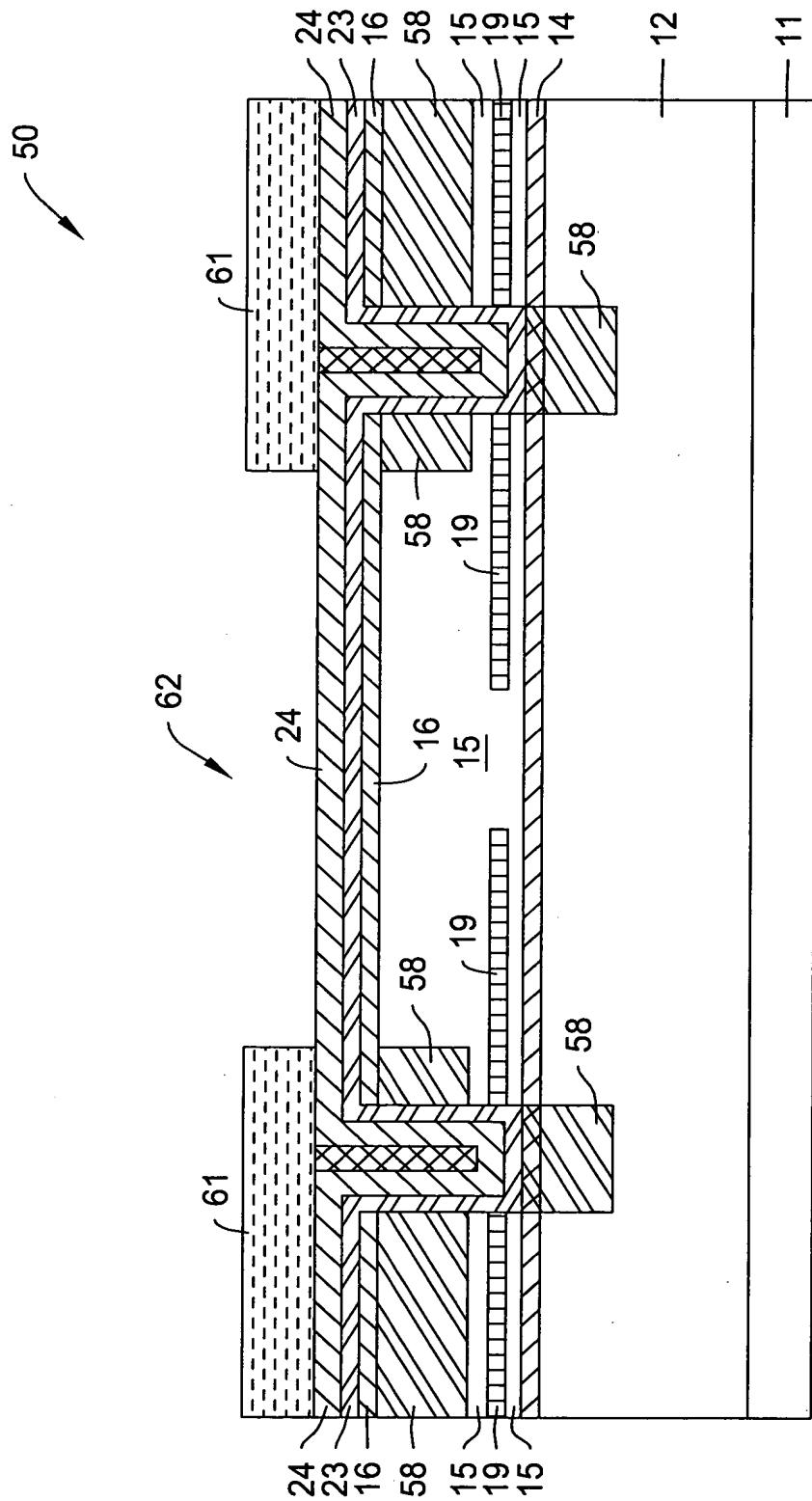


Figure 67

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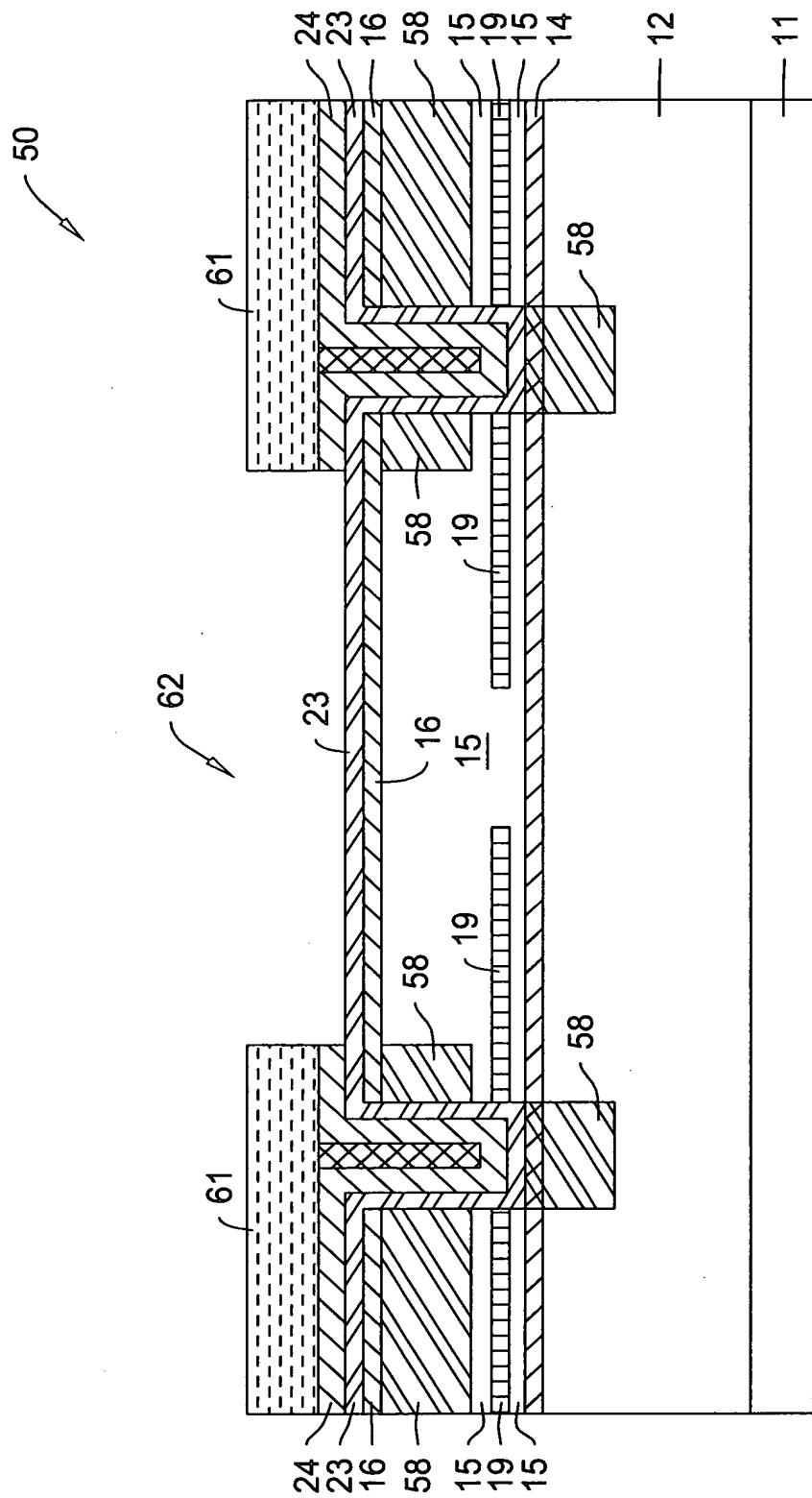


Figure 68

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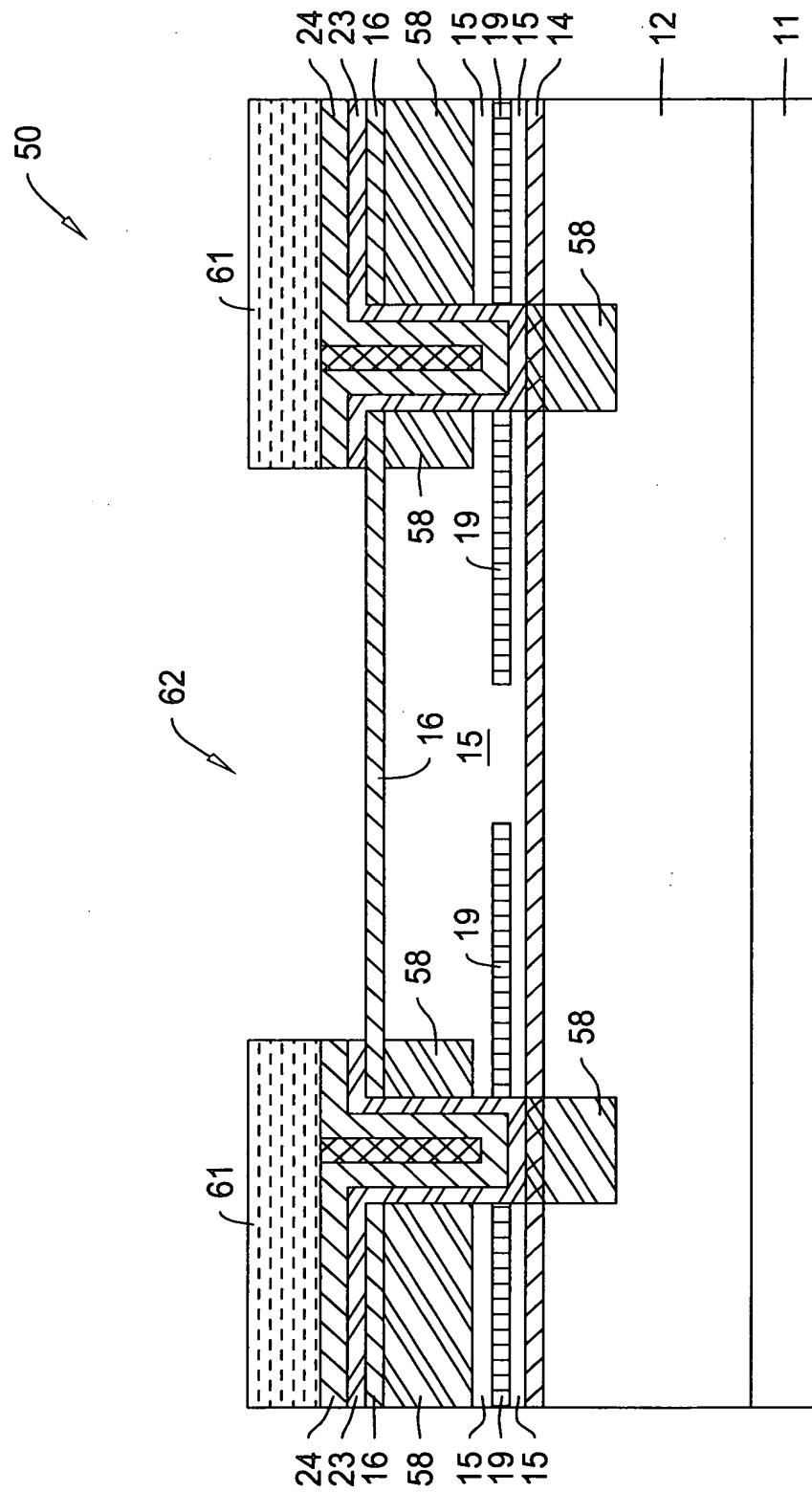


Figure 69

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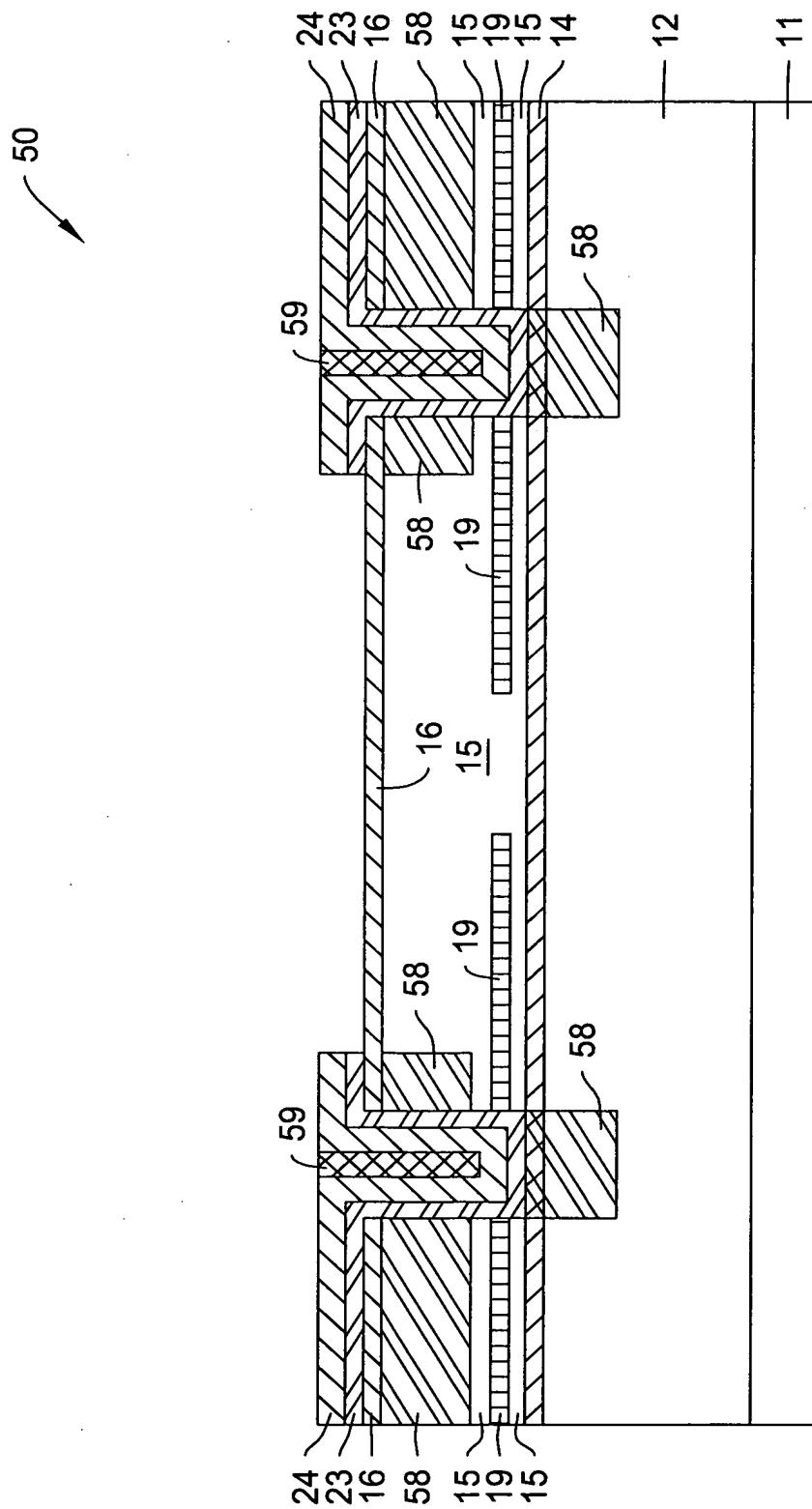


Figure 70

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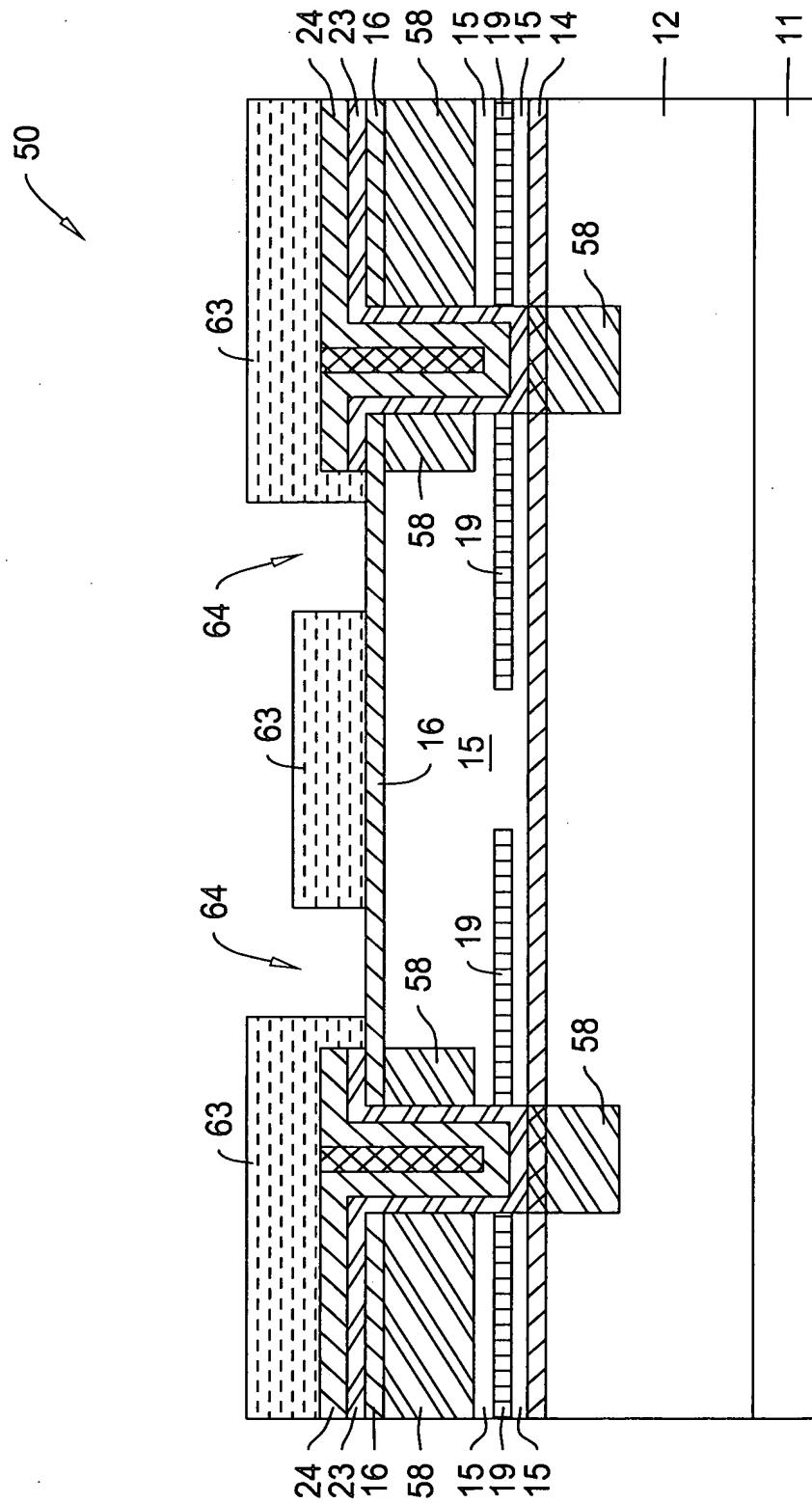


Figure 71

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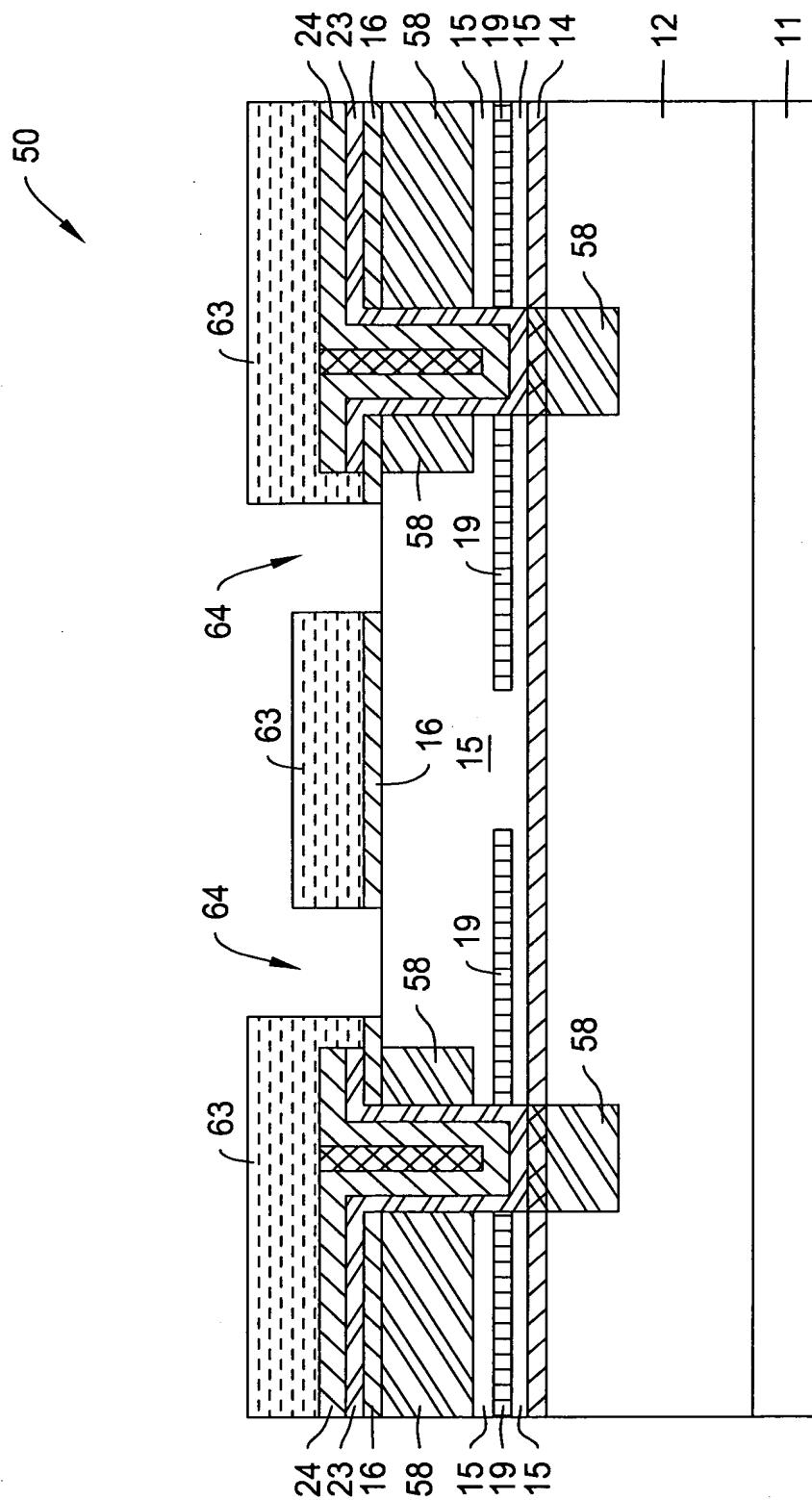


Figure 72

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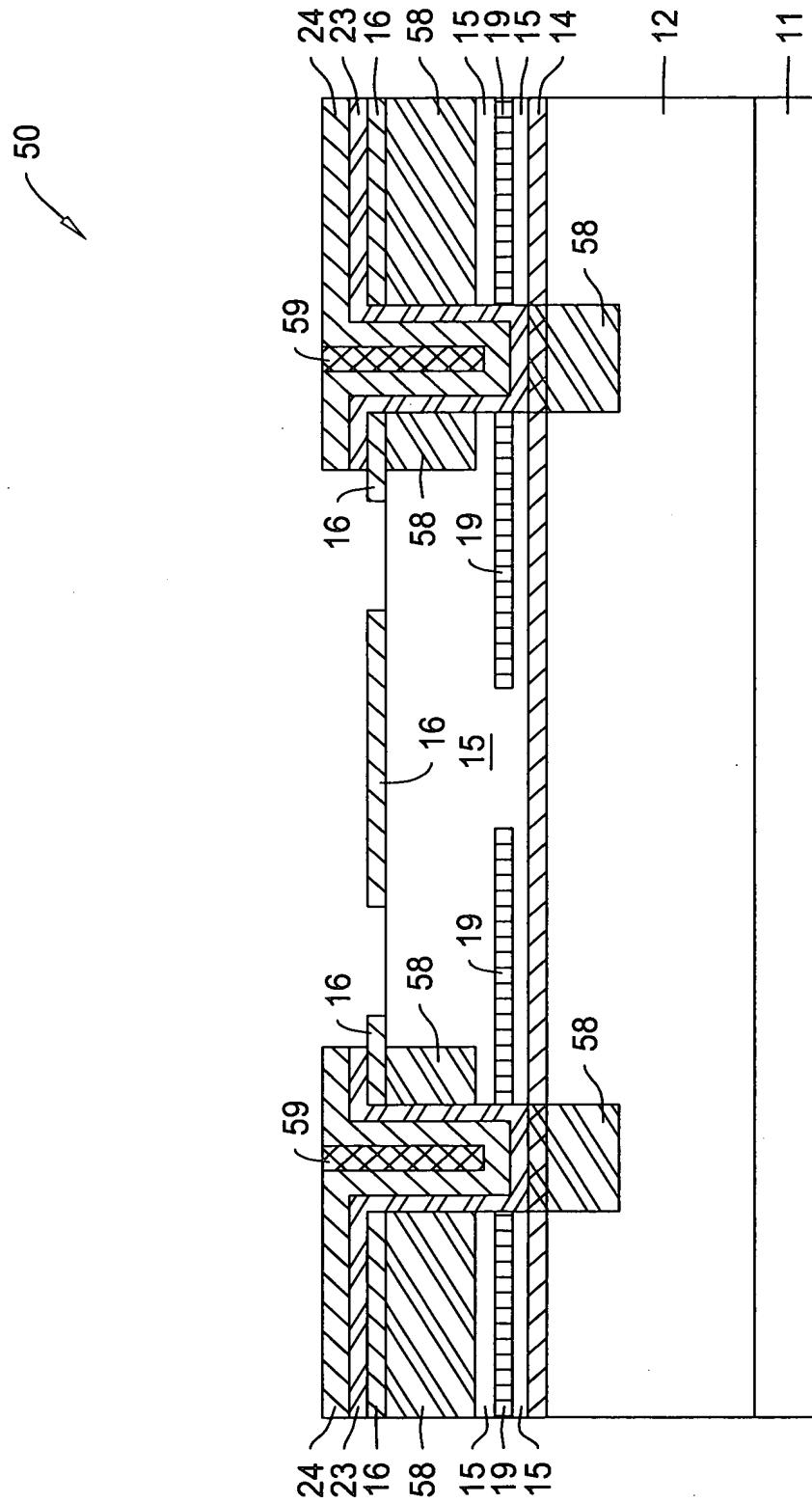


Figure 73

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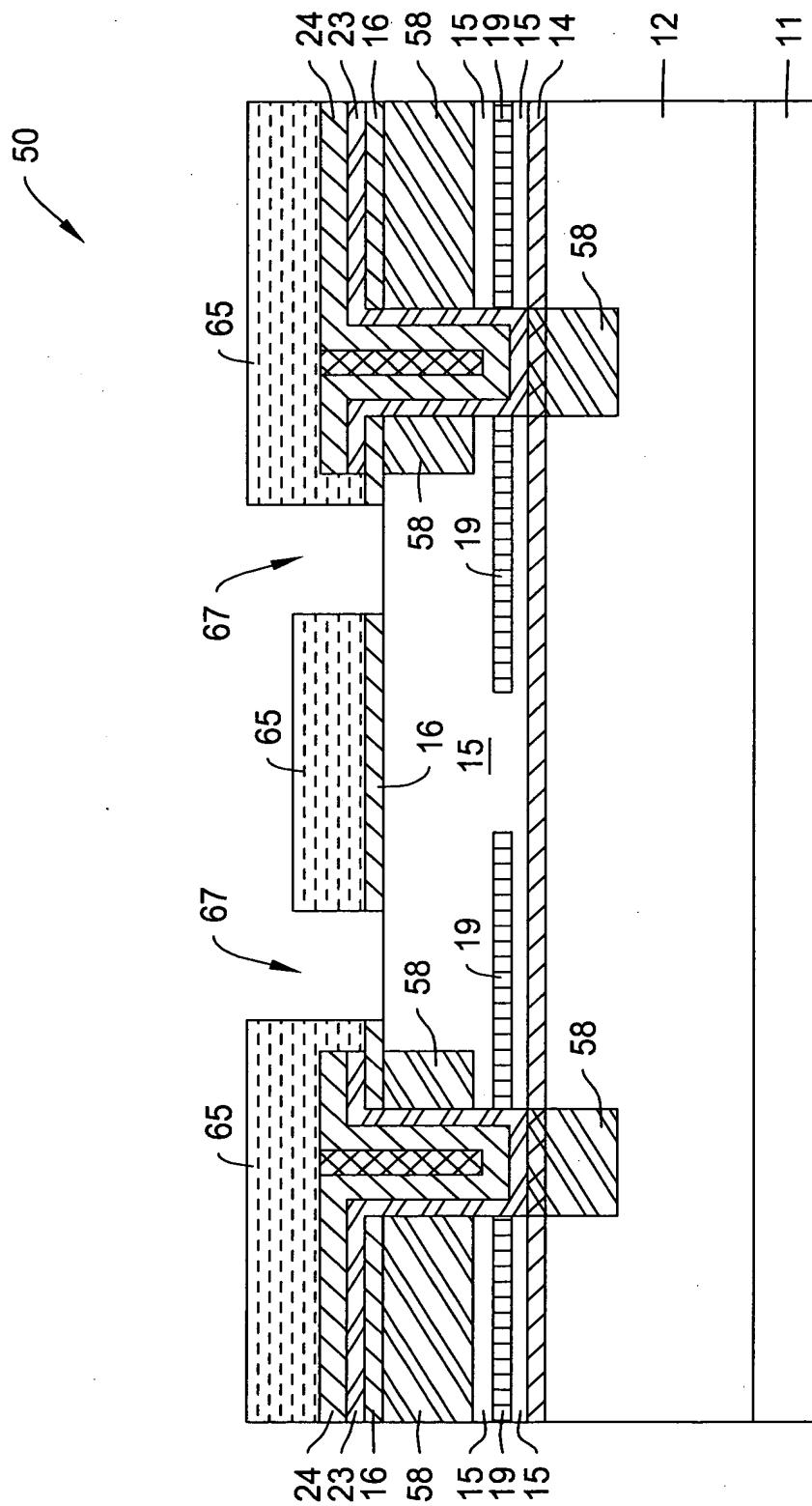


Figure 74

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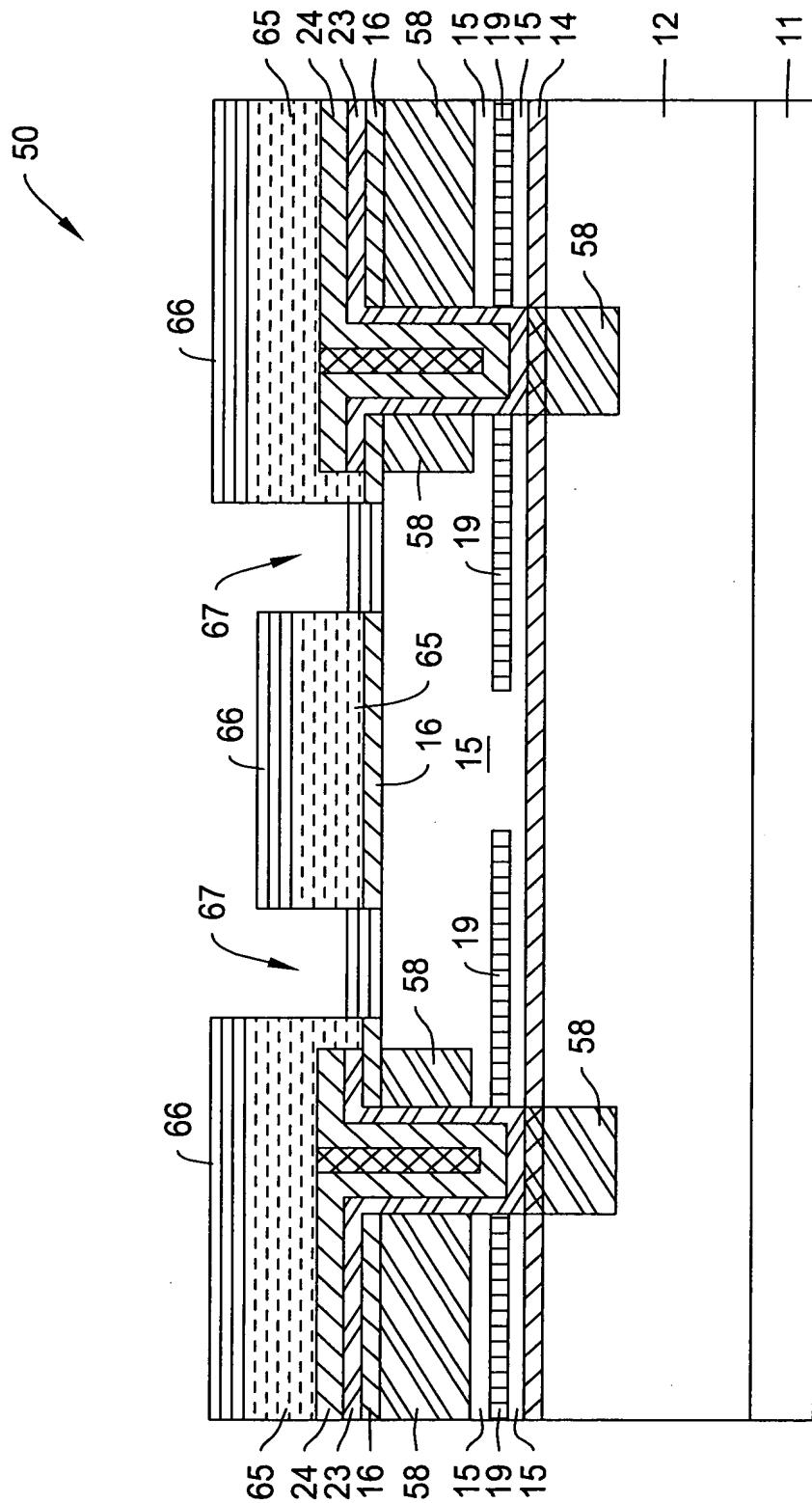


Figure 75

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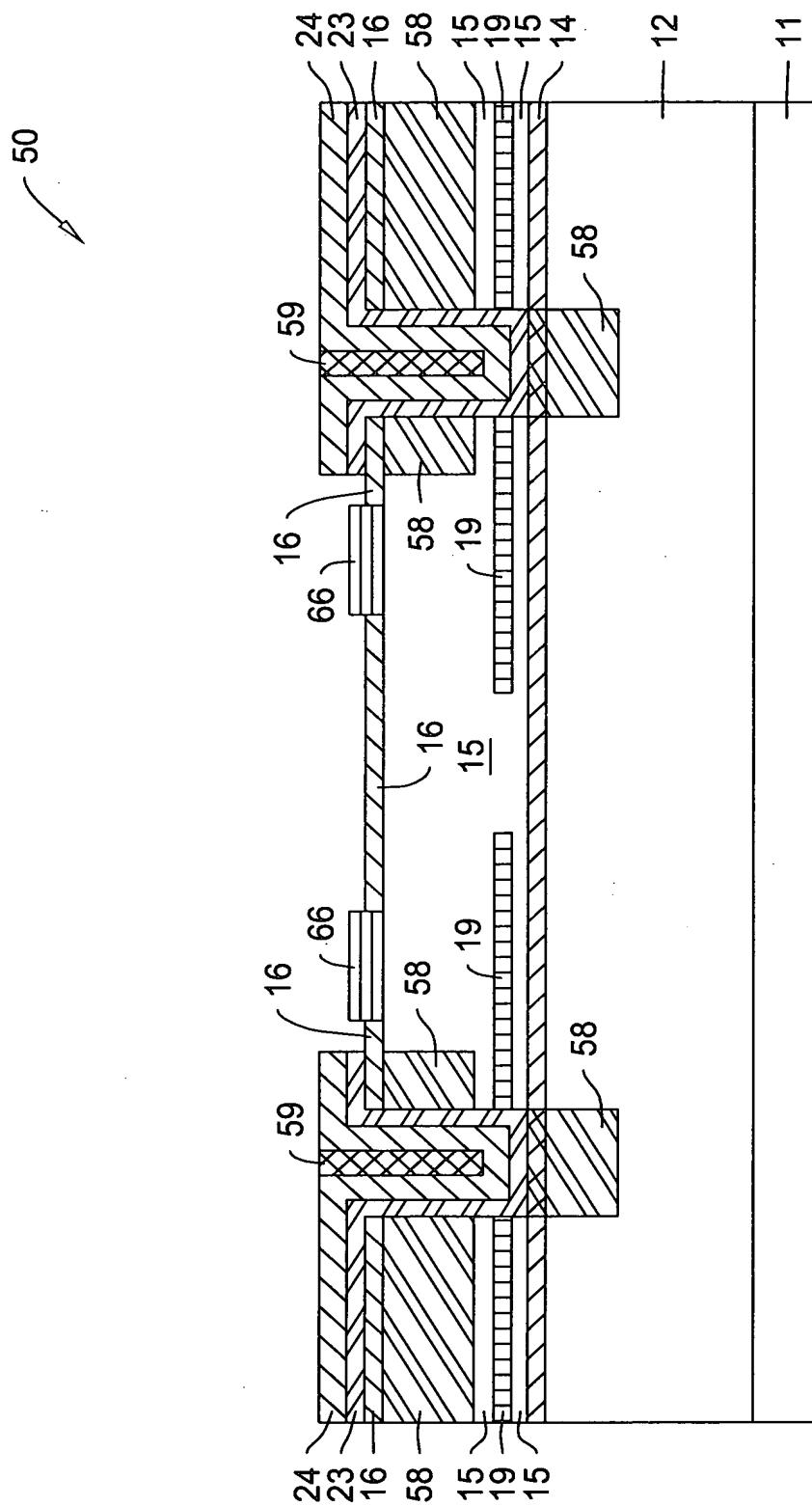


Figure 76

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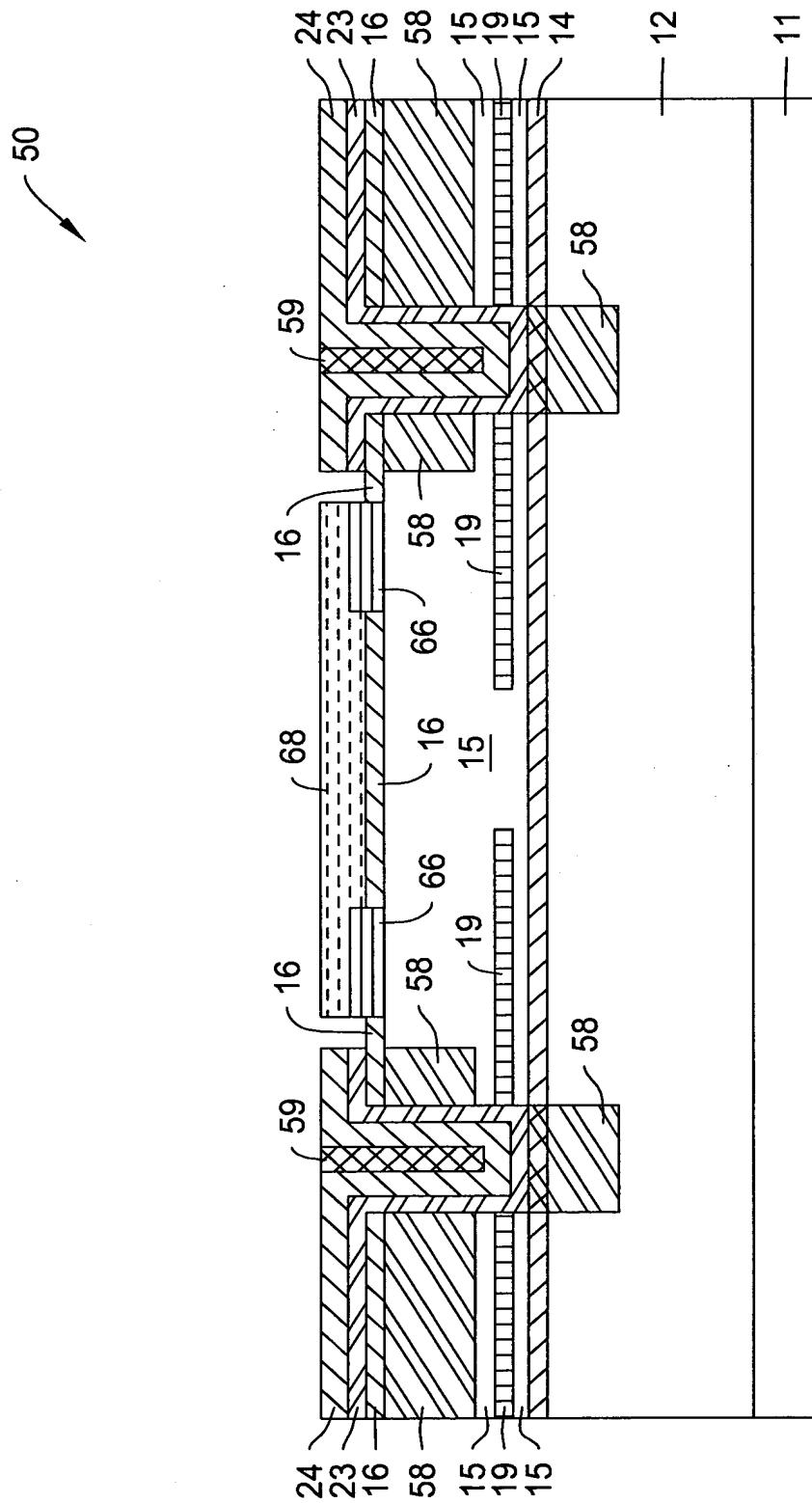


Figure 77

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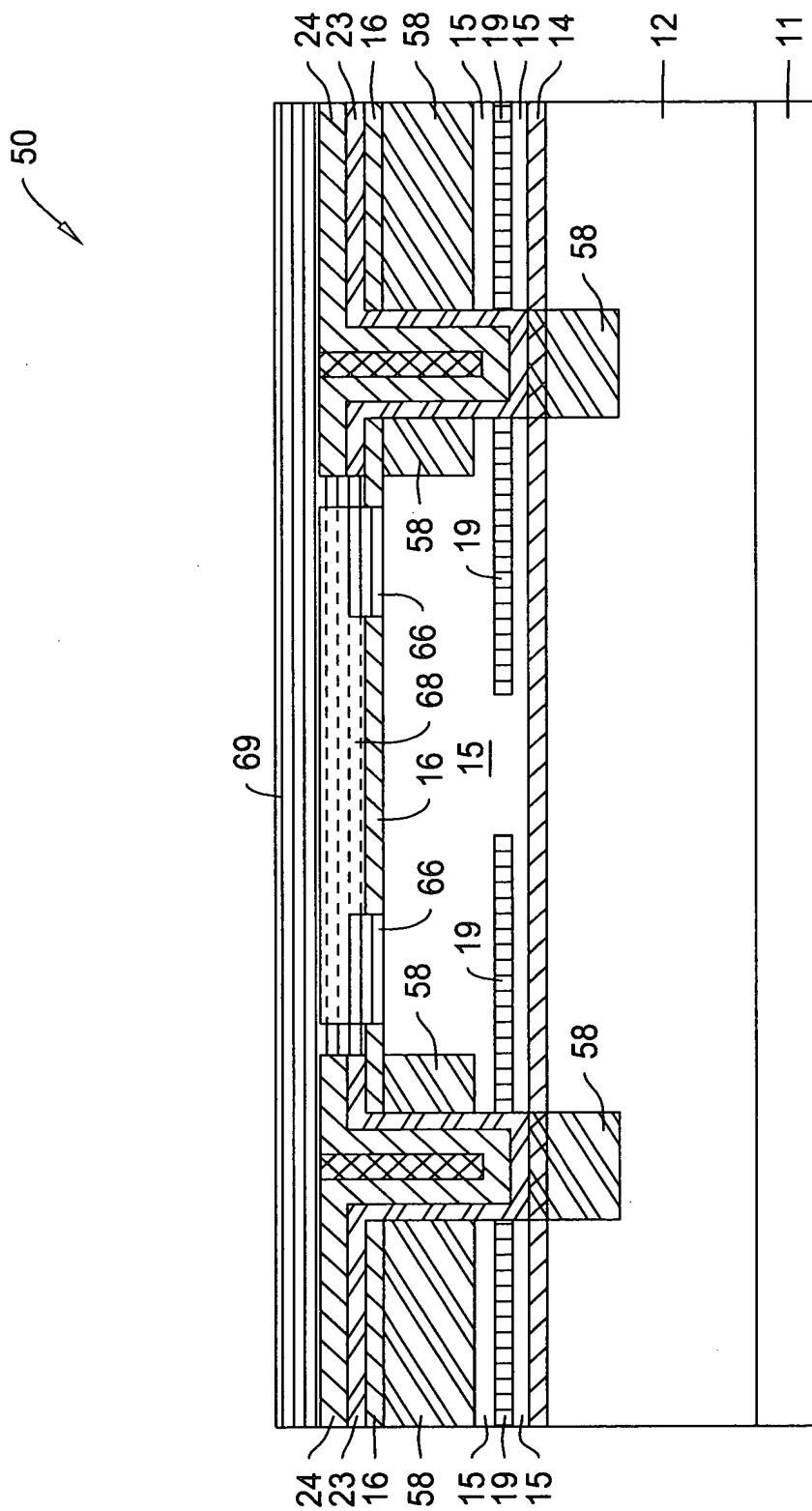


Figure 78

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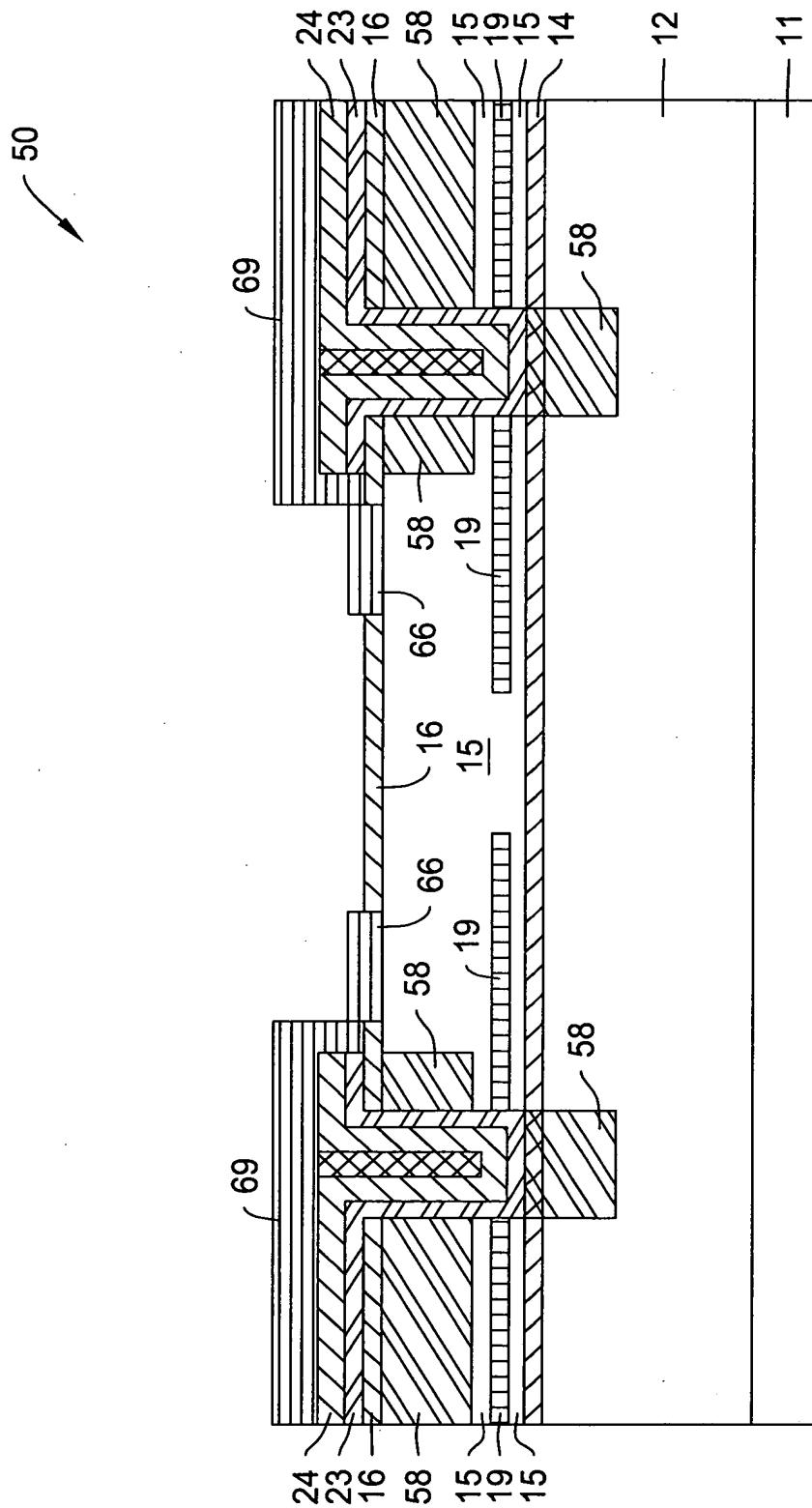


Figure 79

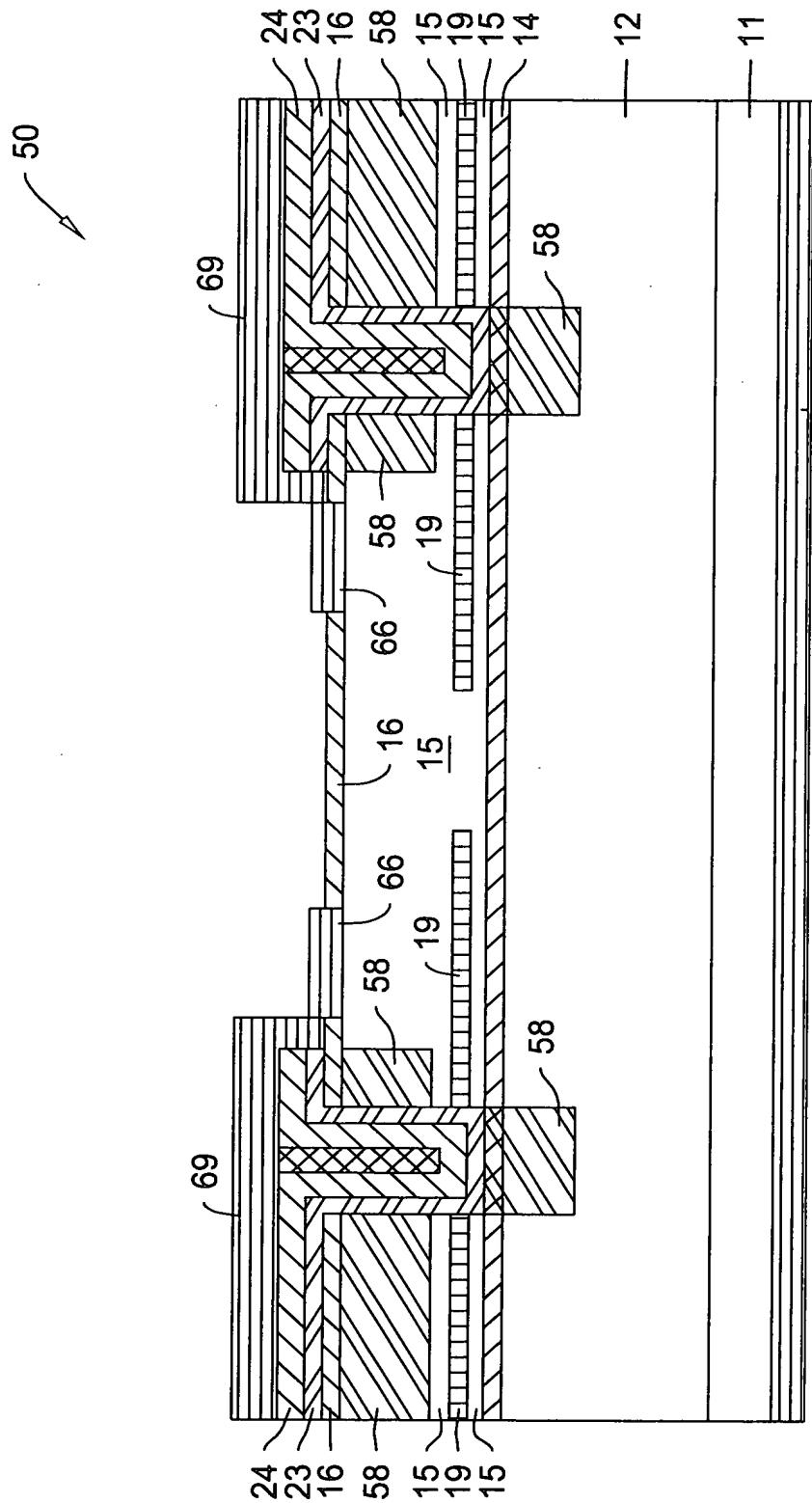


Figure 80

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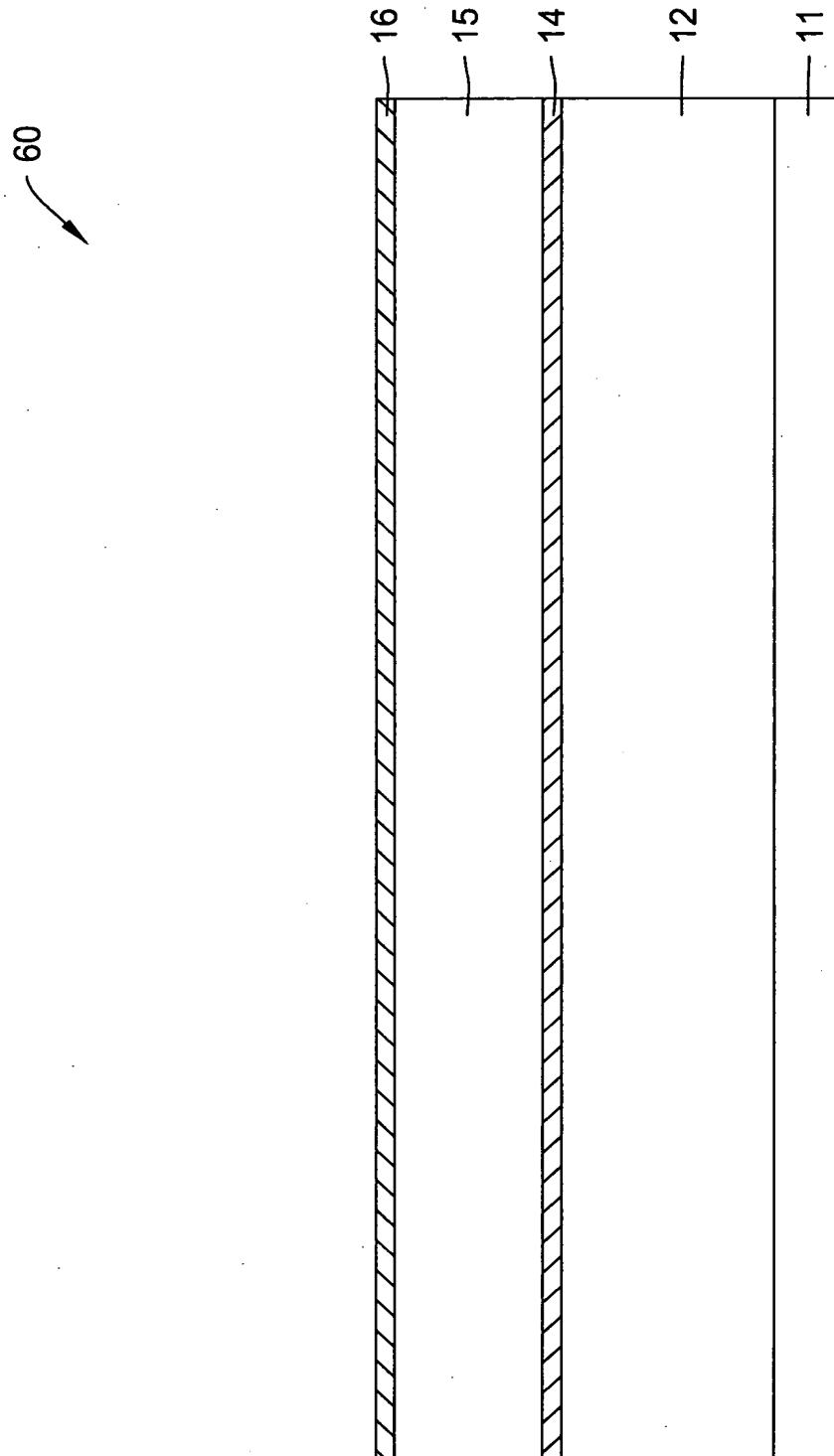


Figure 81

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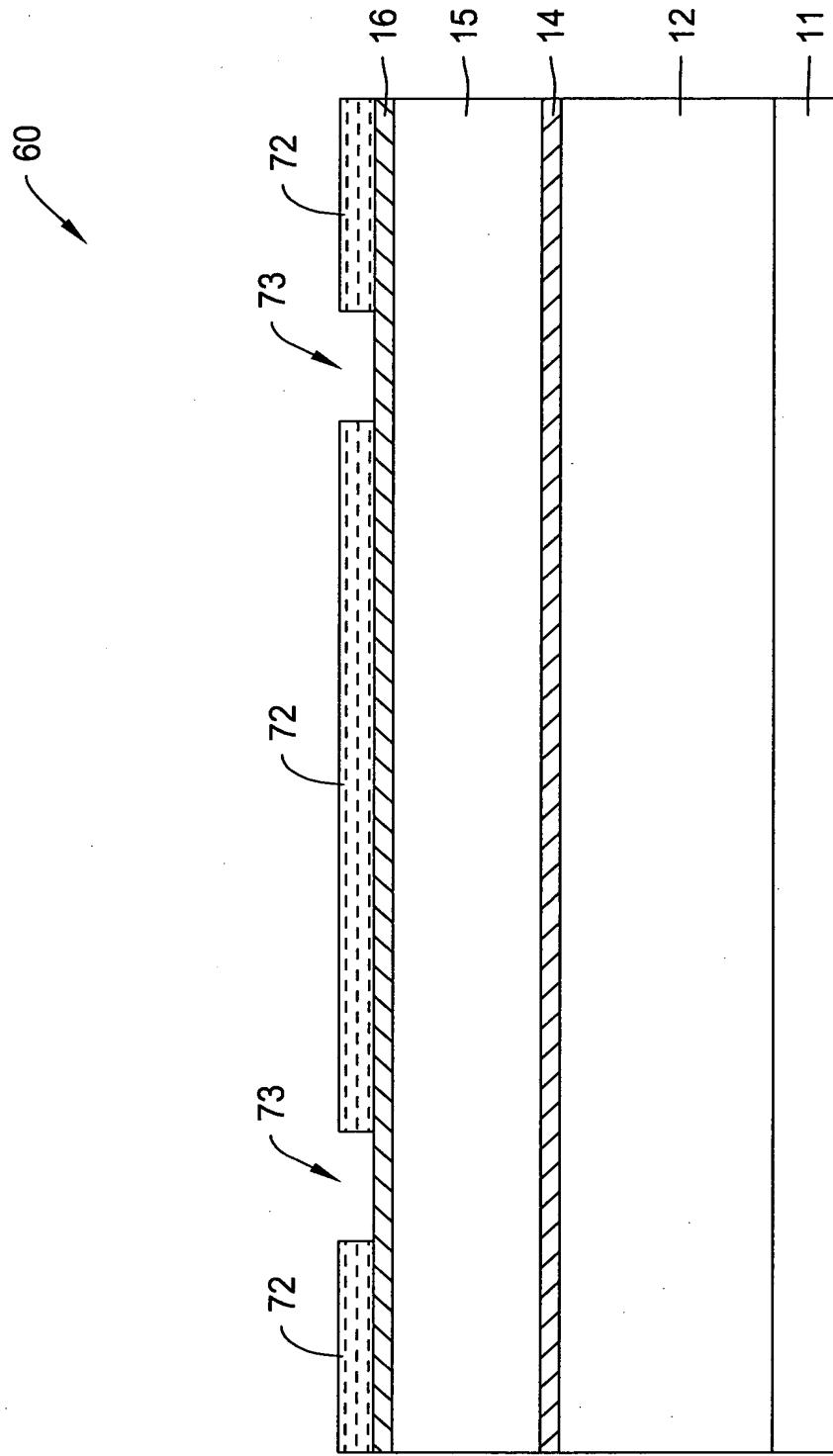


Figure 82

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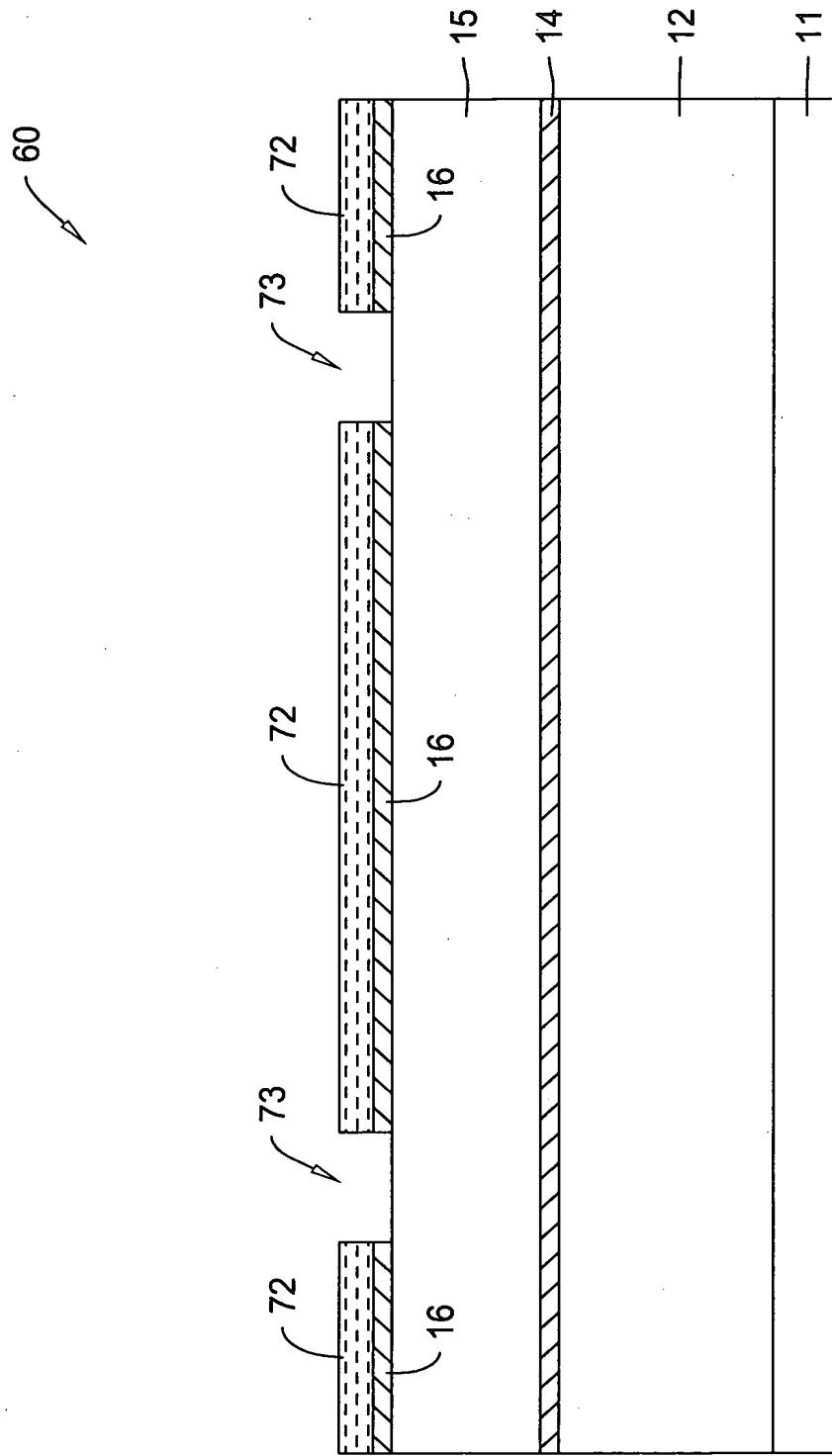


Figure 83

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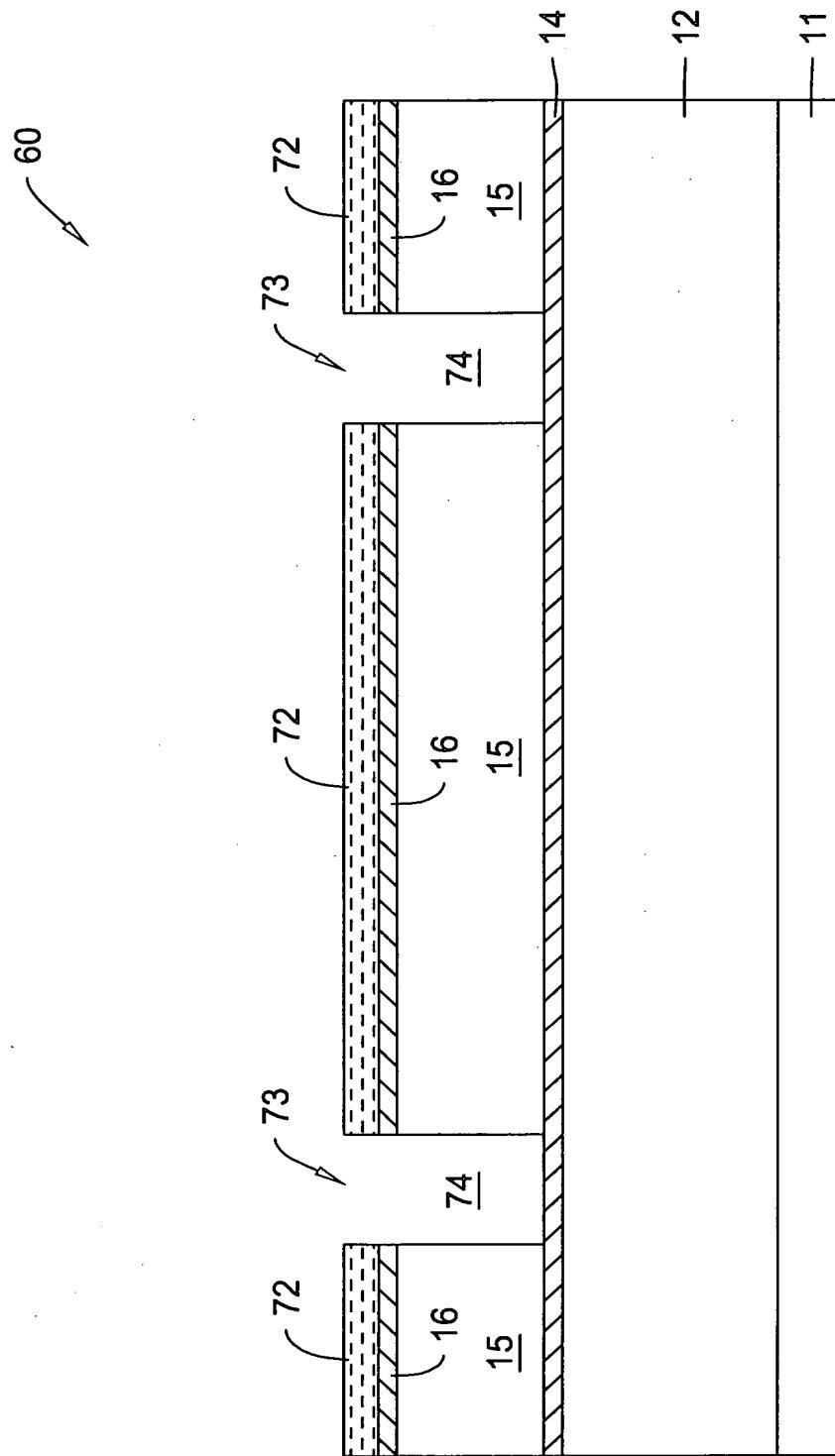


Figure 84

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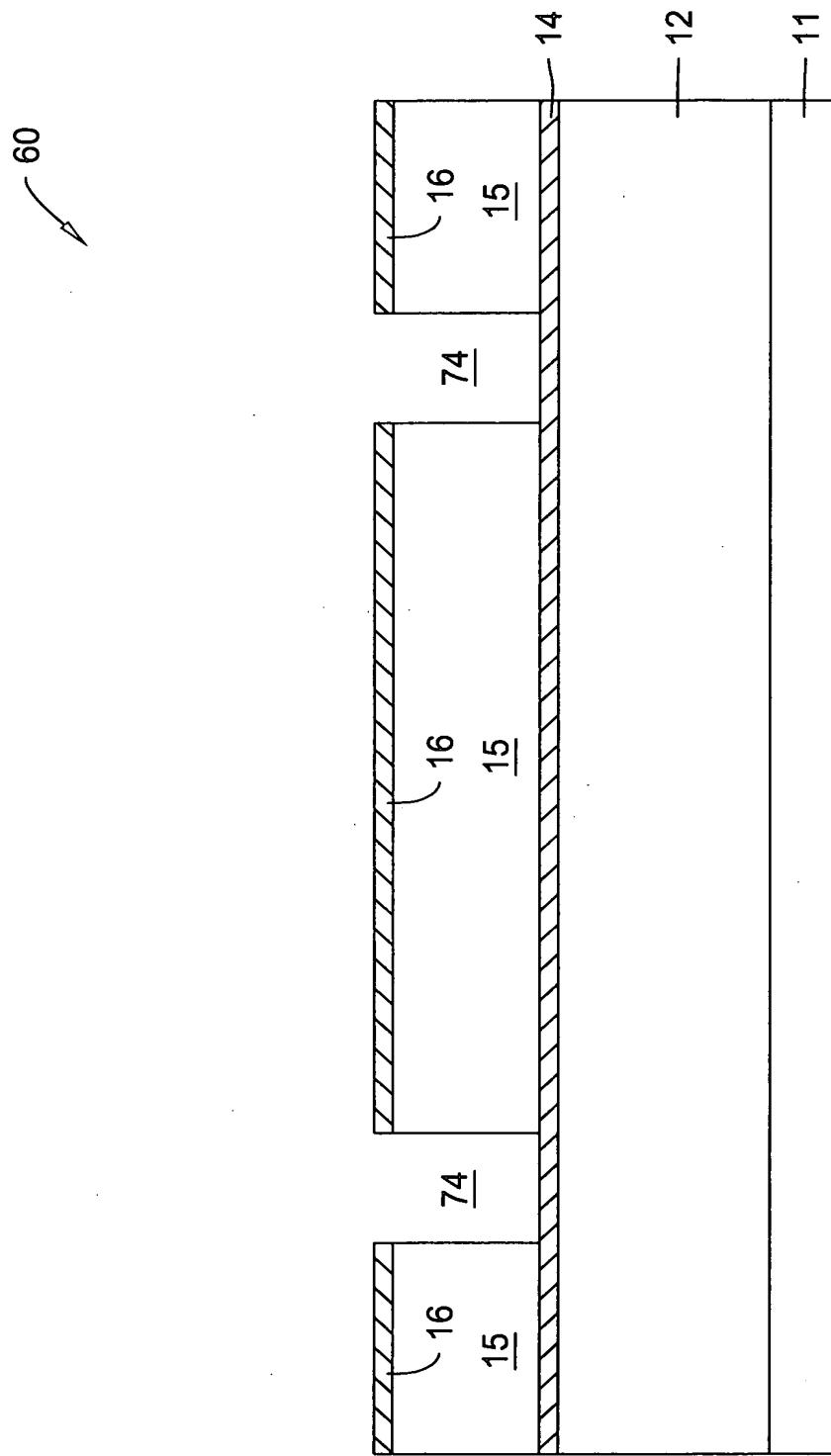


Figure 85

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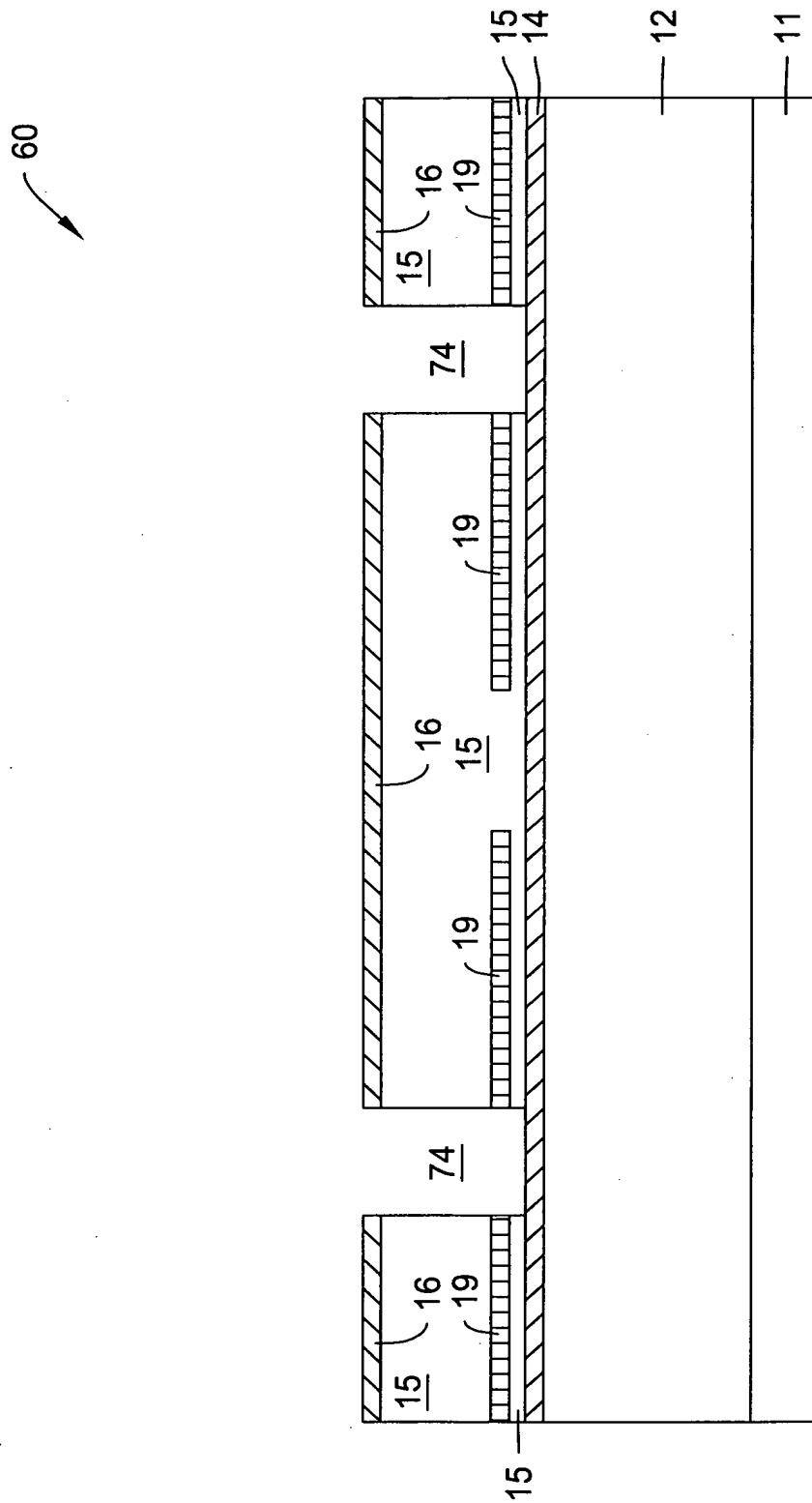


Figure 86

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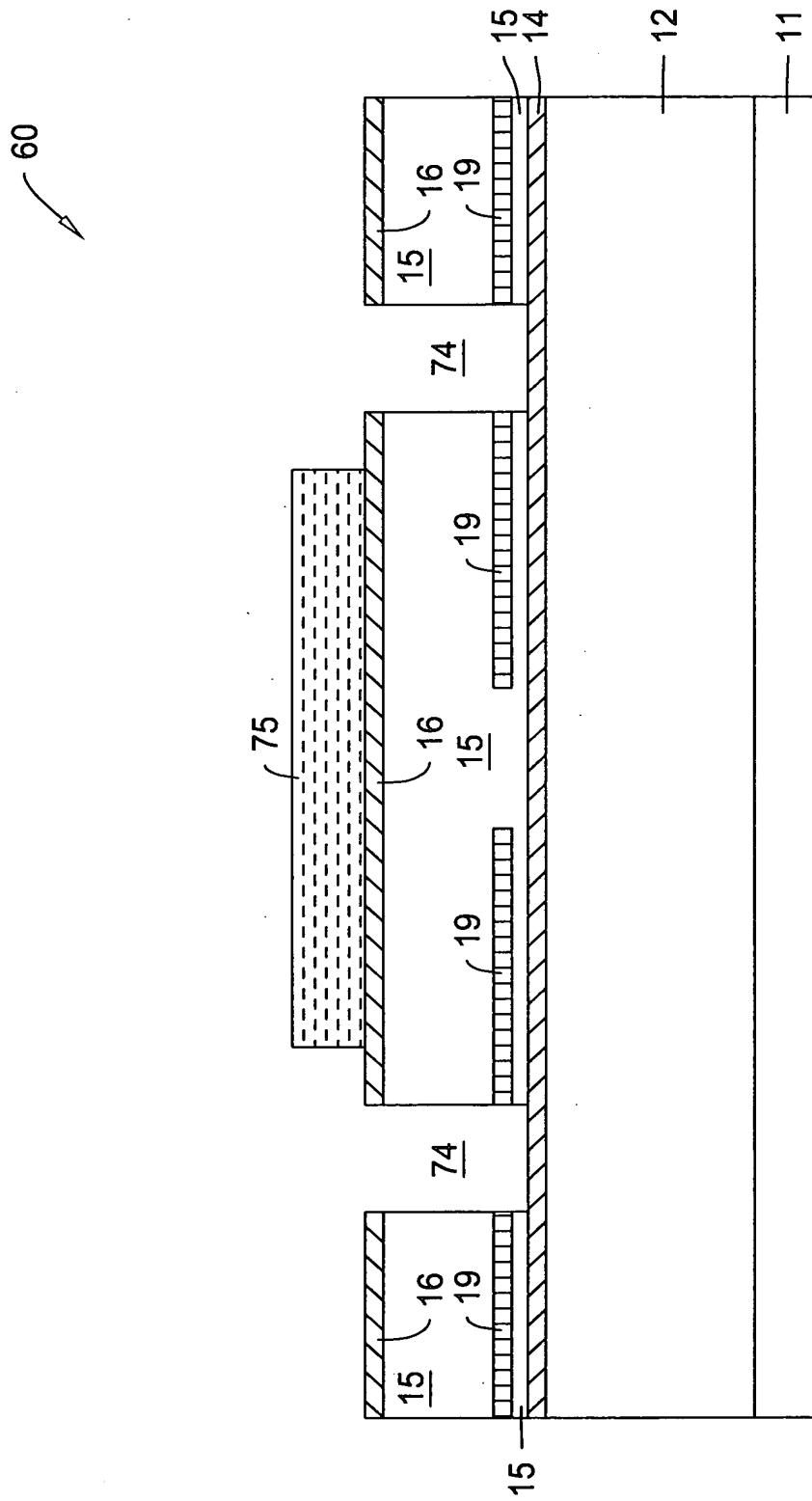


Figure 87

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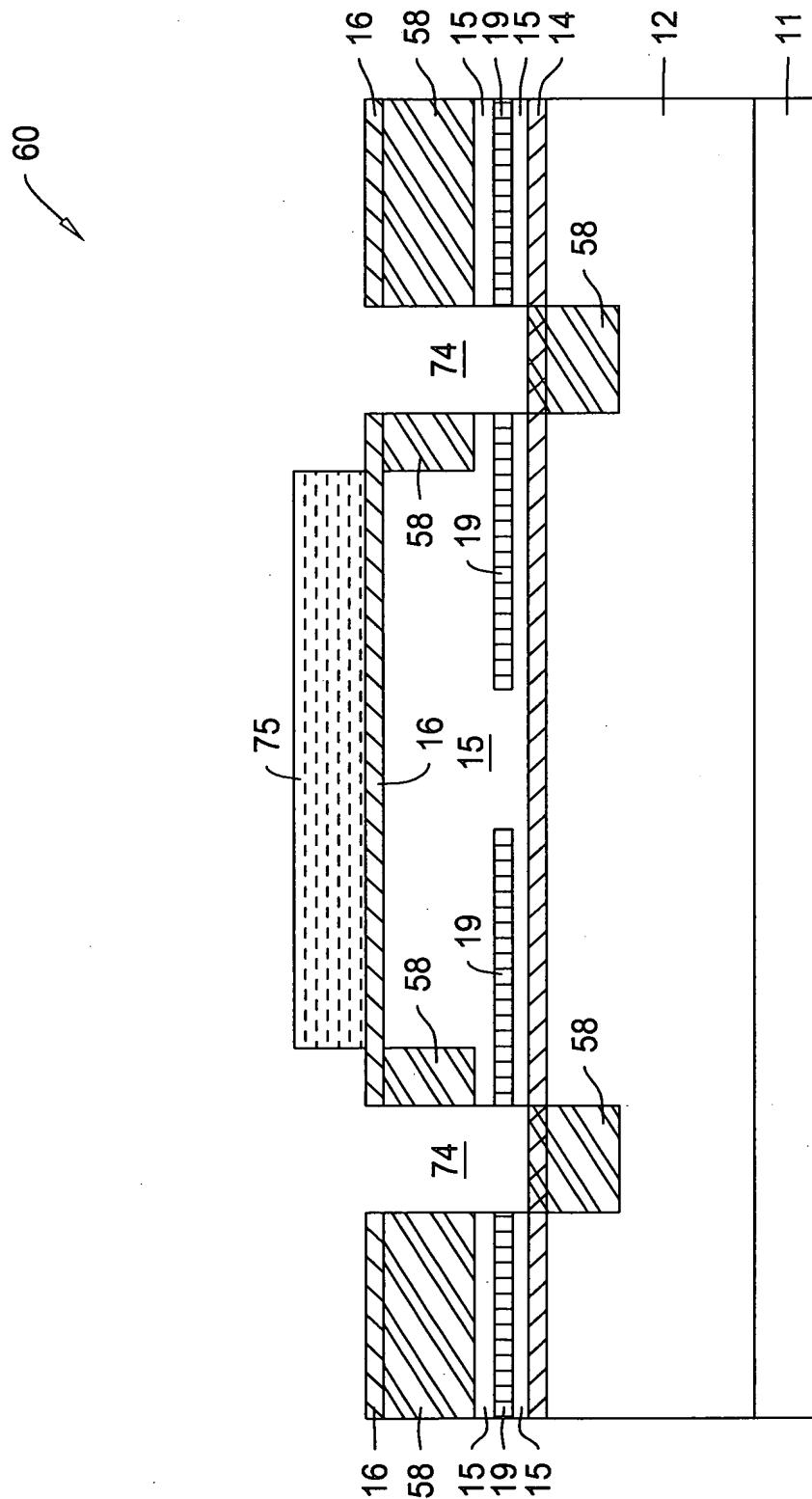


Figure 88

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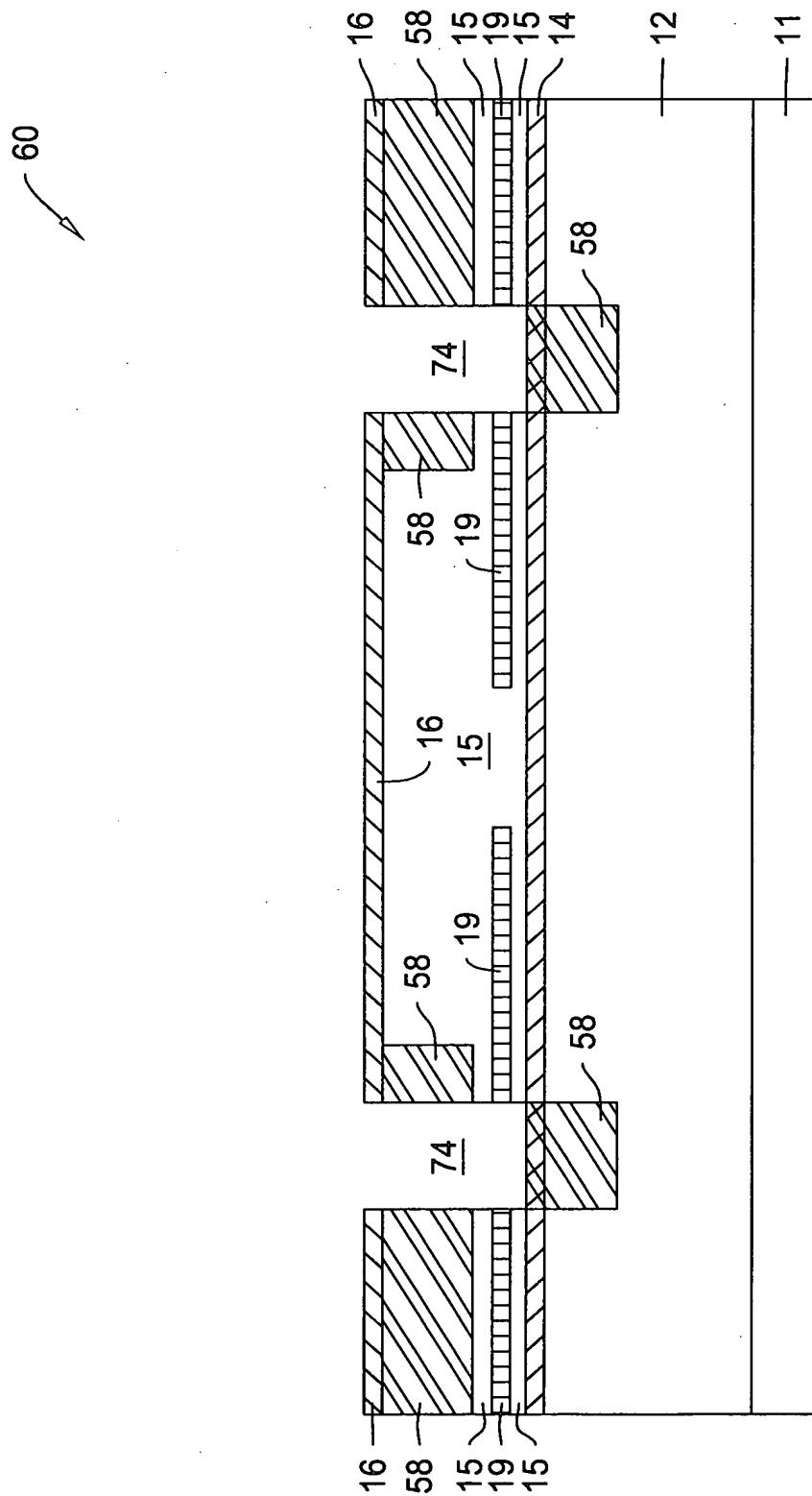


Figure 89

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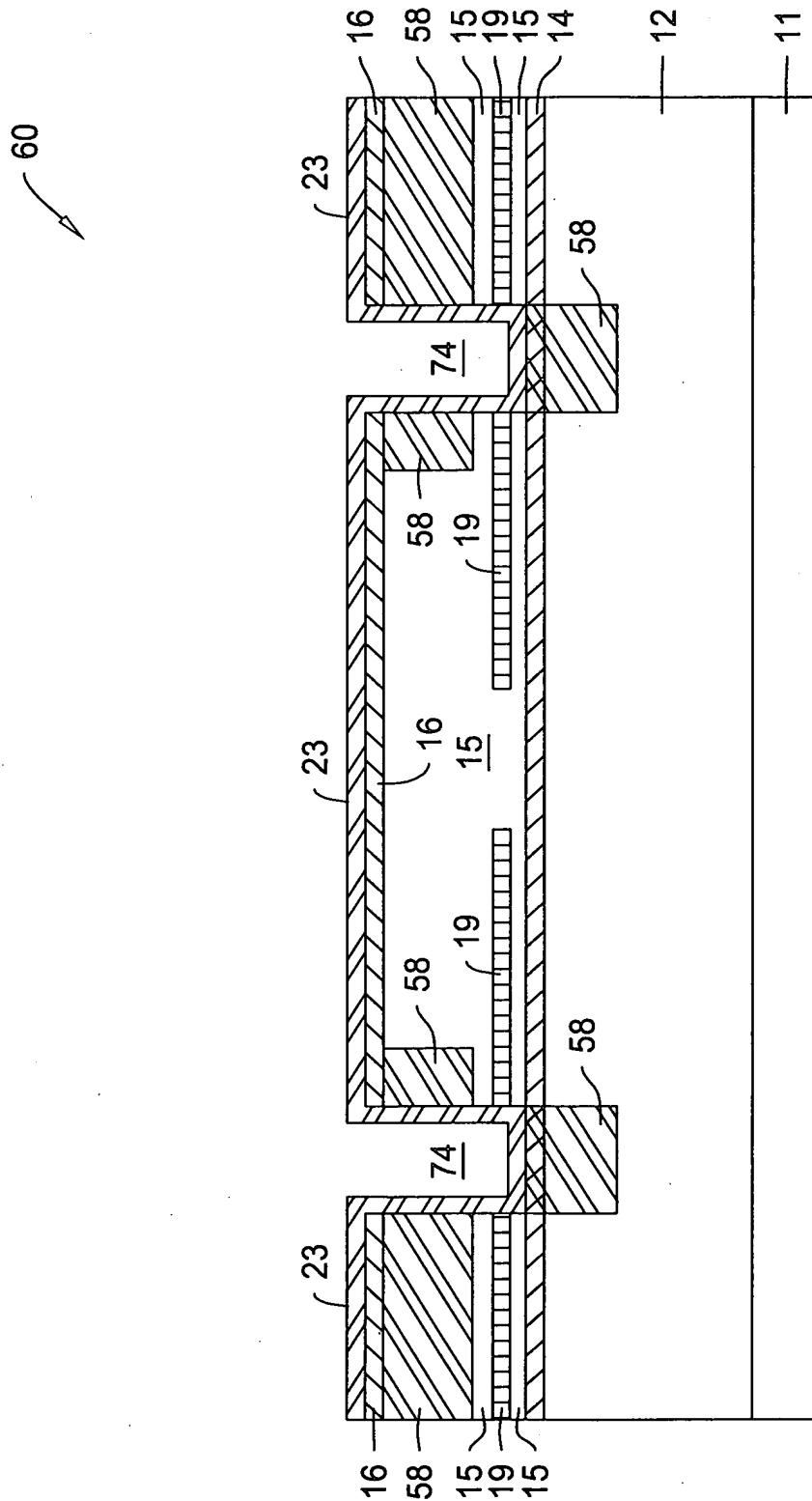


Figure 90

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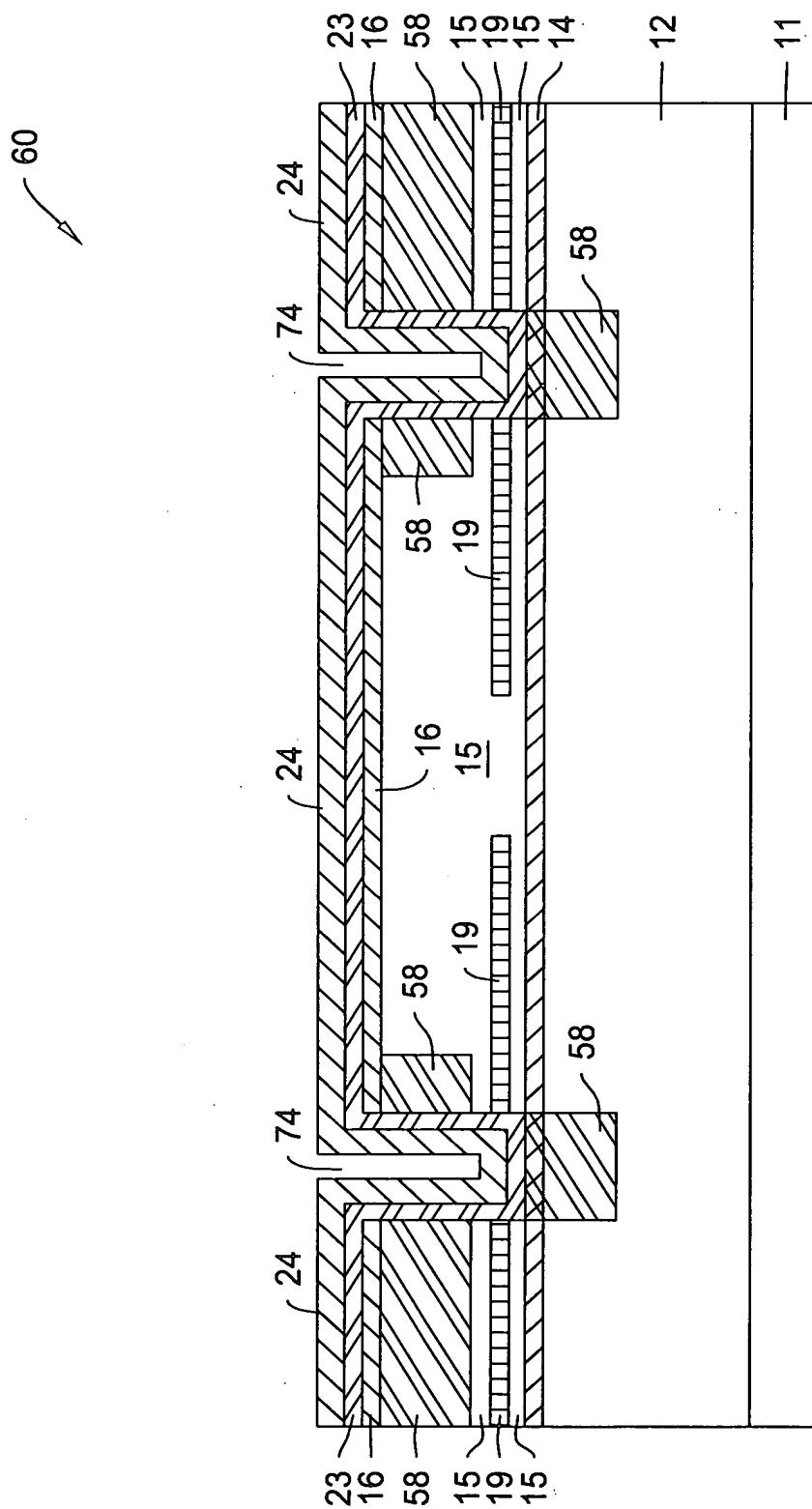


Figure 91

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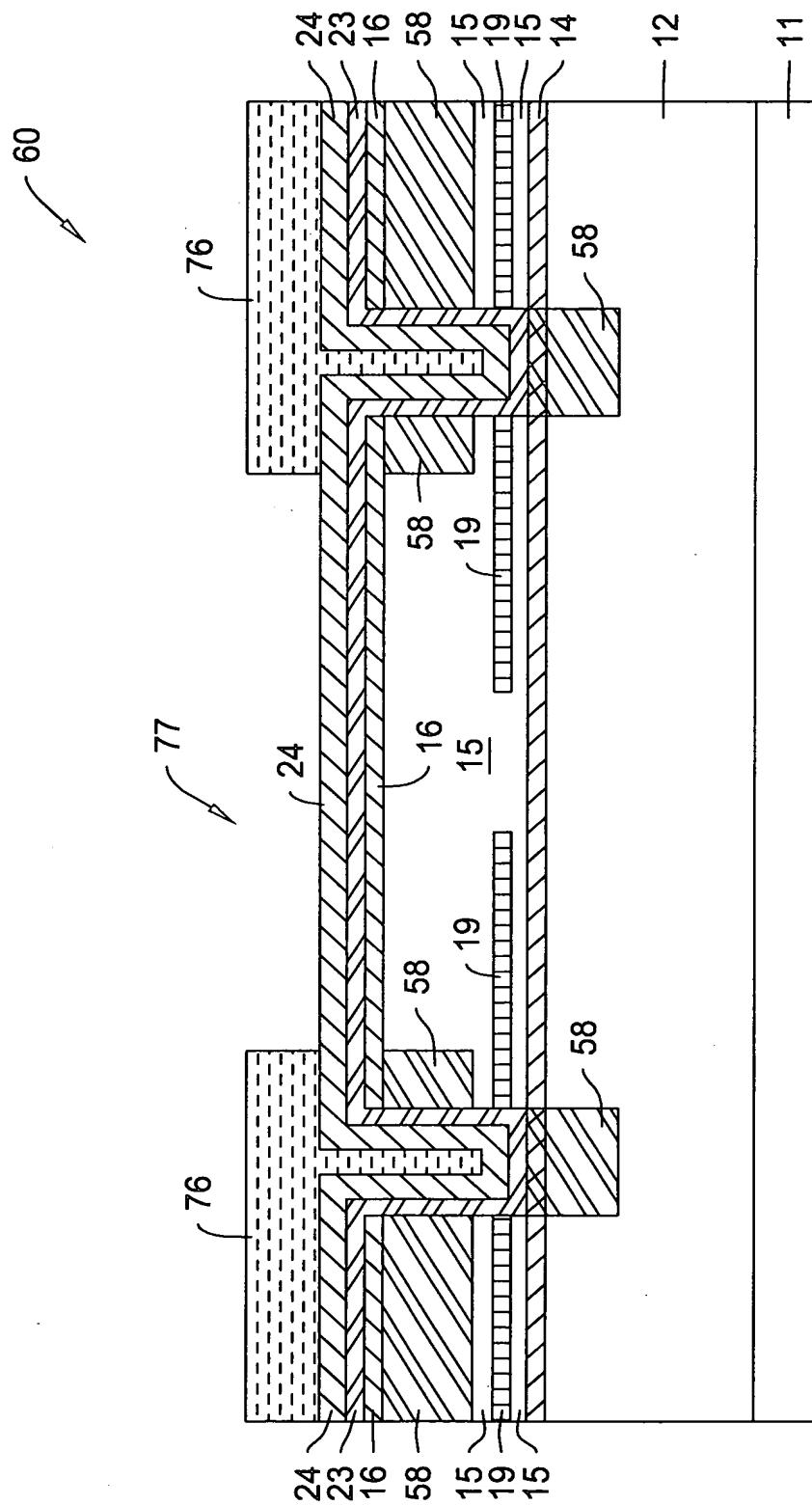


Figure 92

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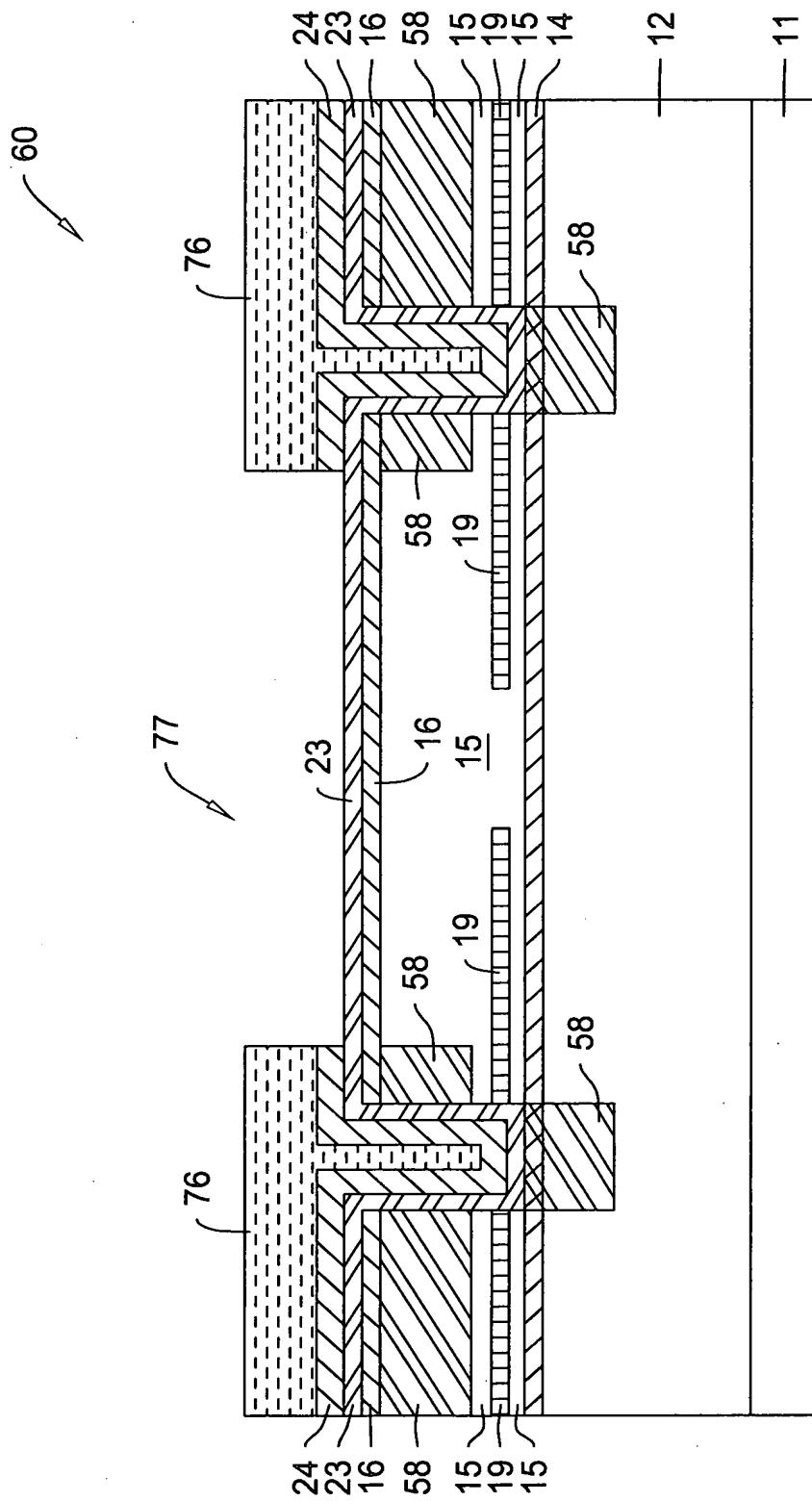


Figure 93

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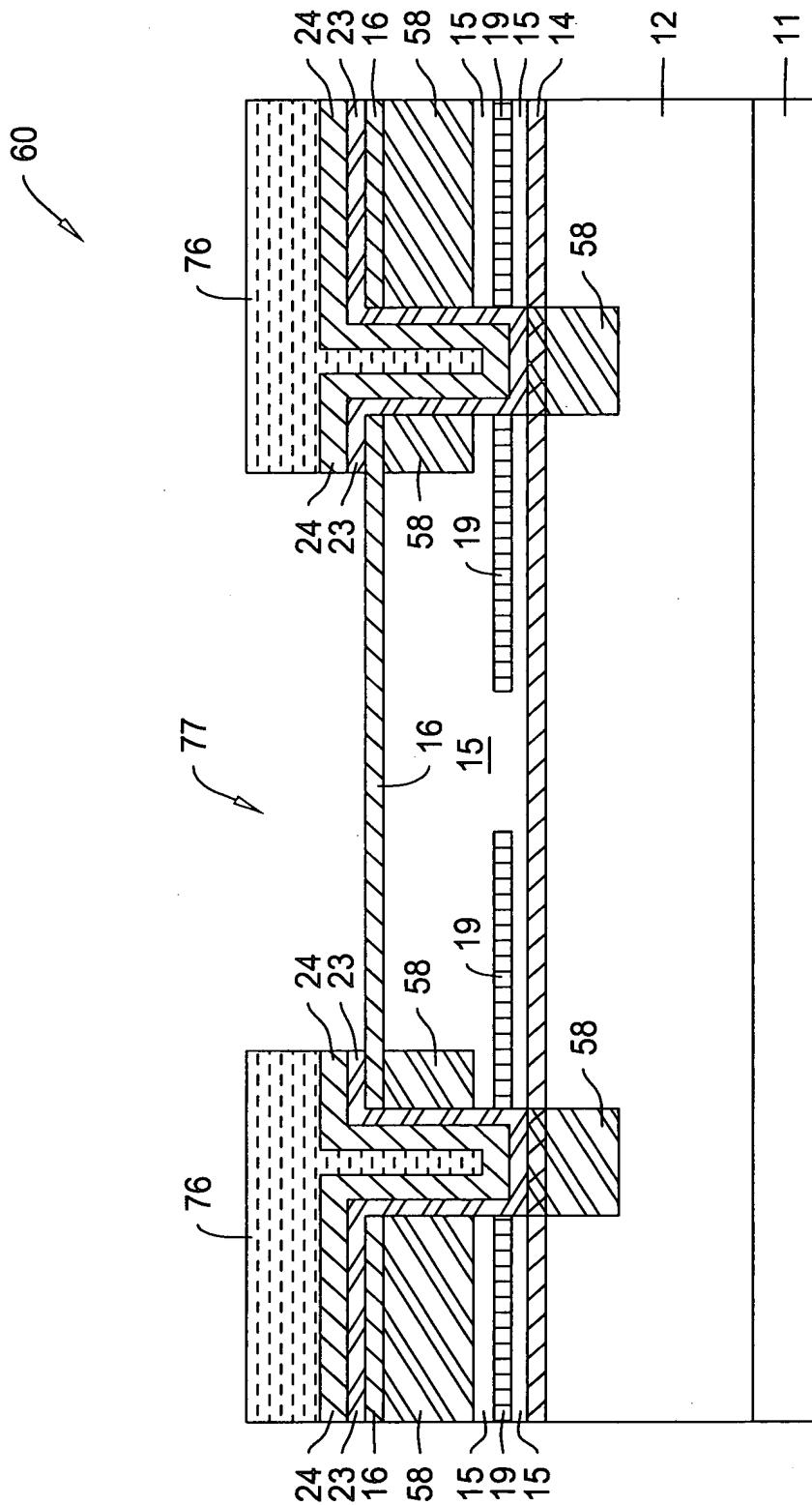


Figure 94

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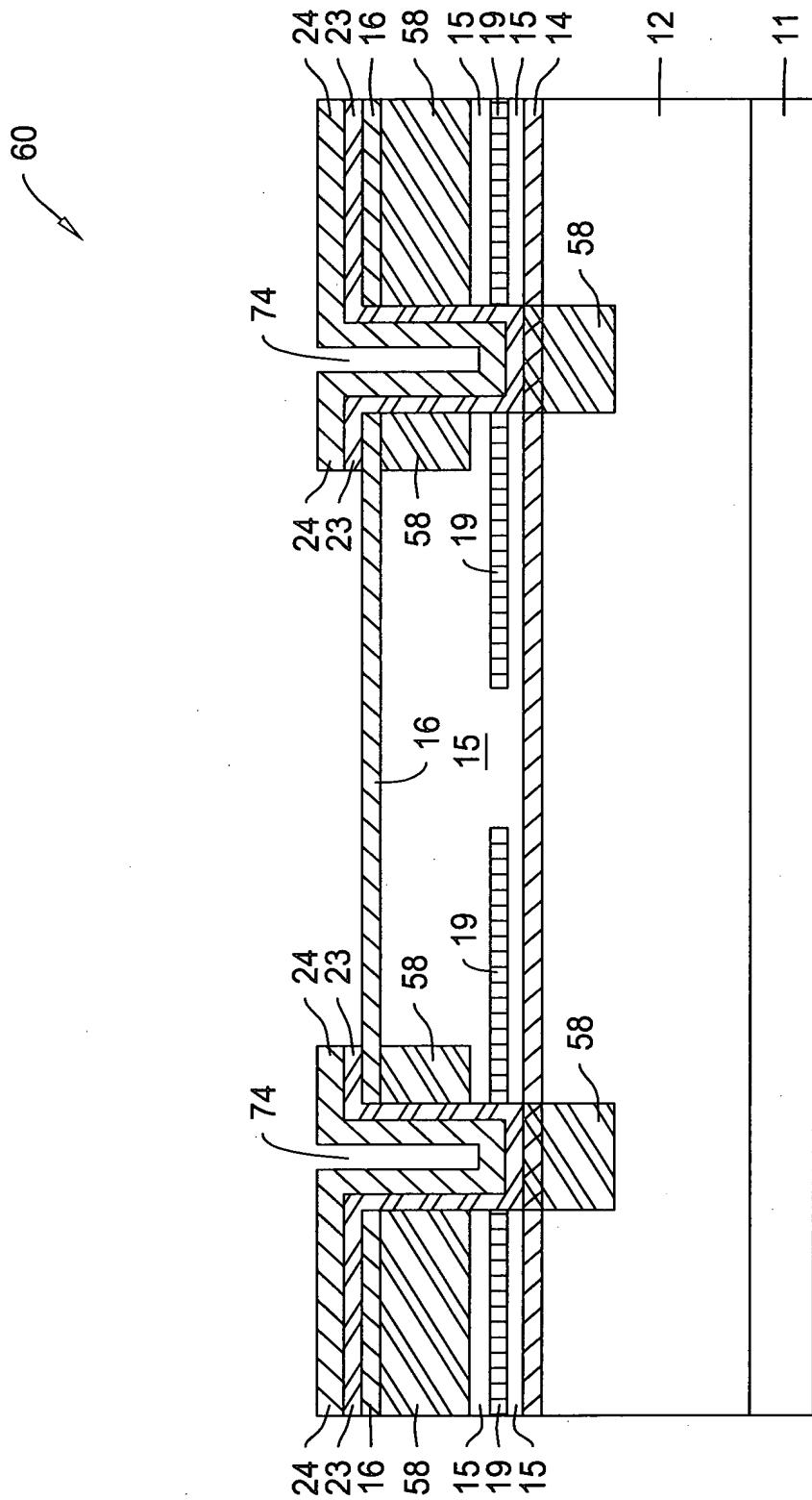


Figure 95

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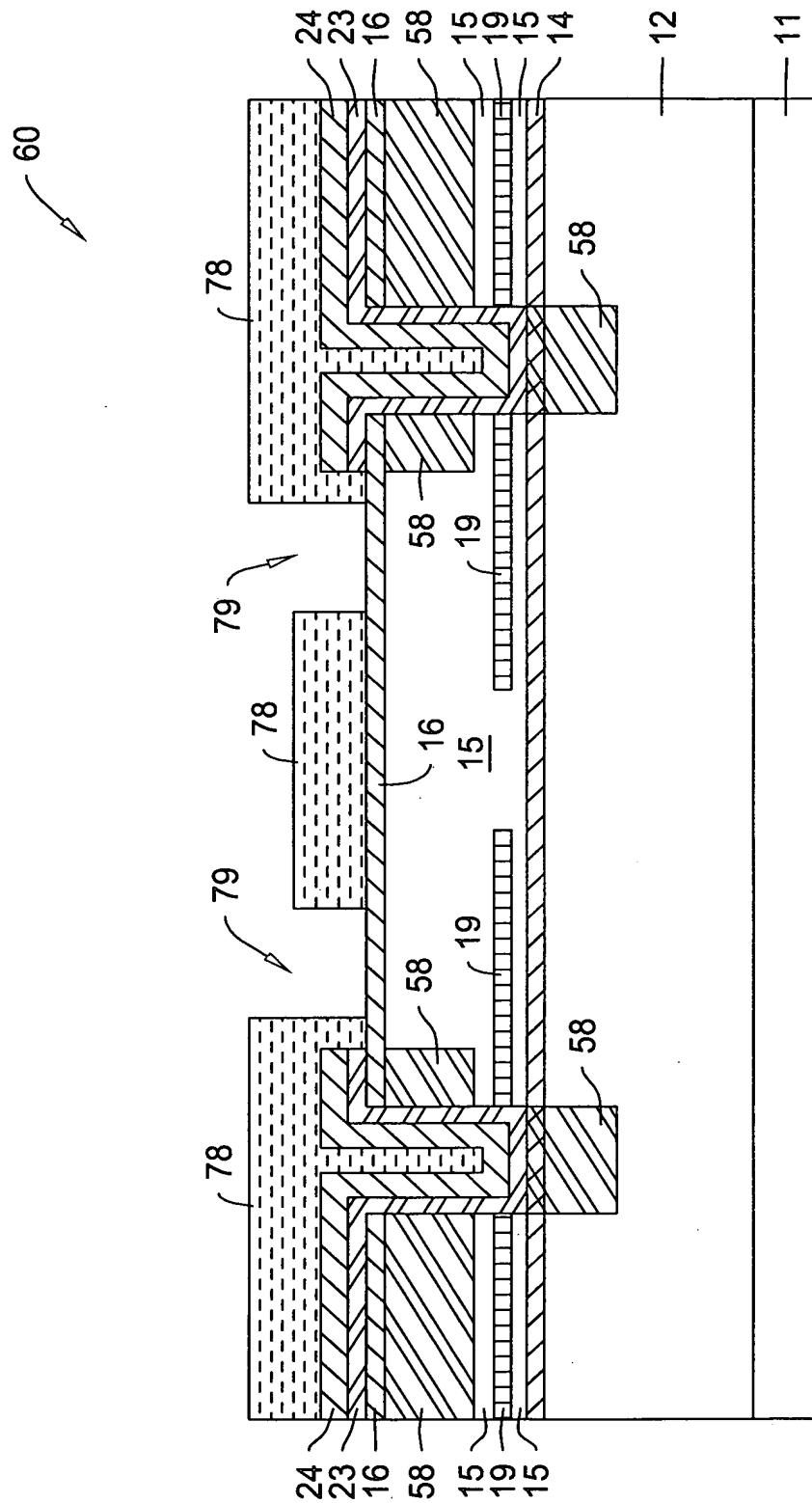


Figure 96

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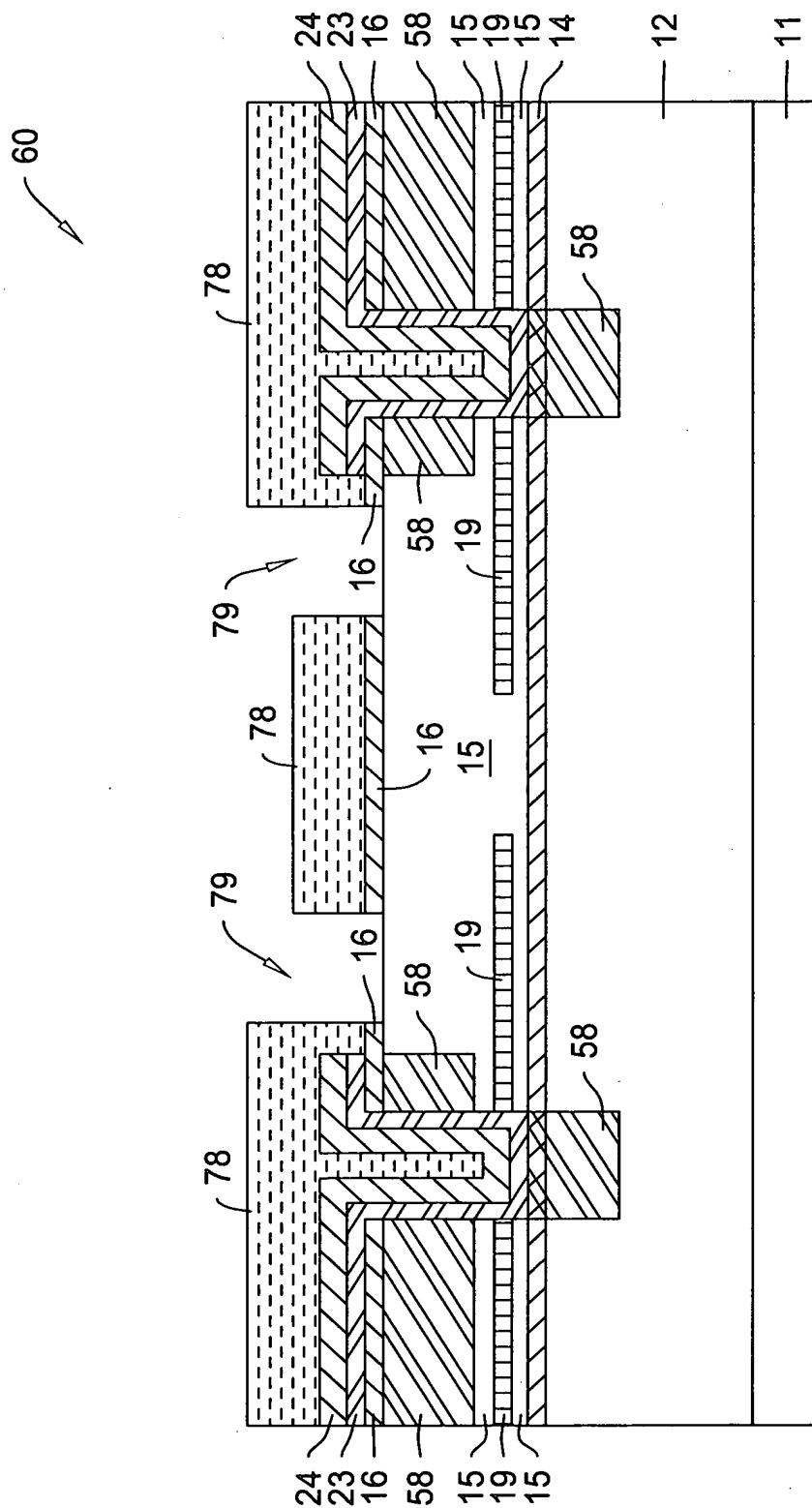


Figure 97

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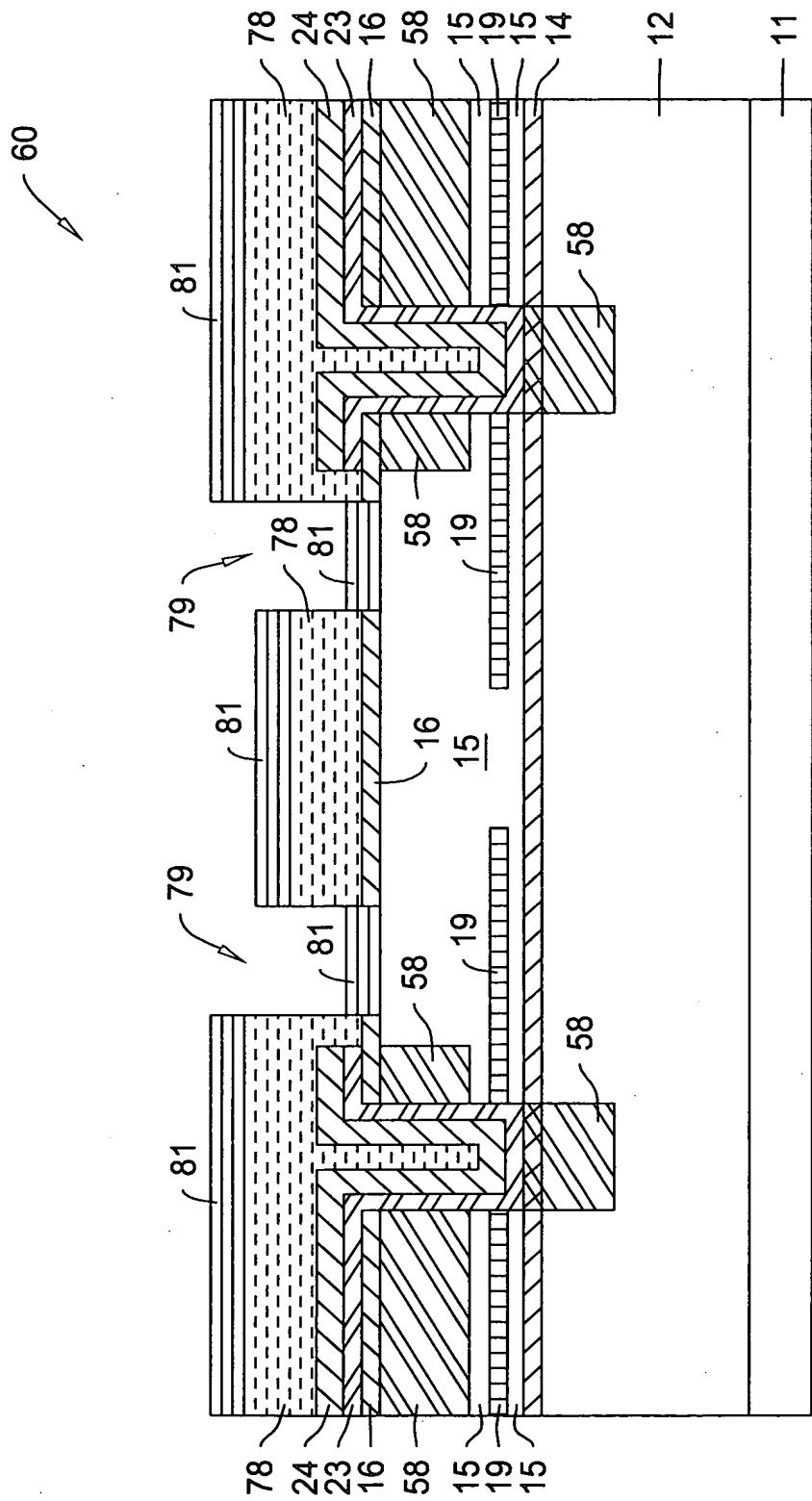


Figure 98

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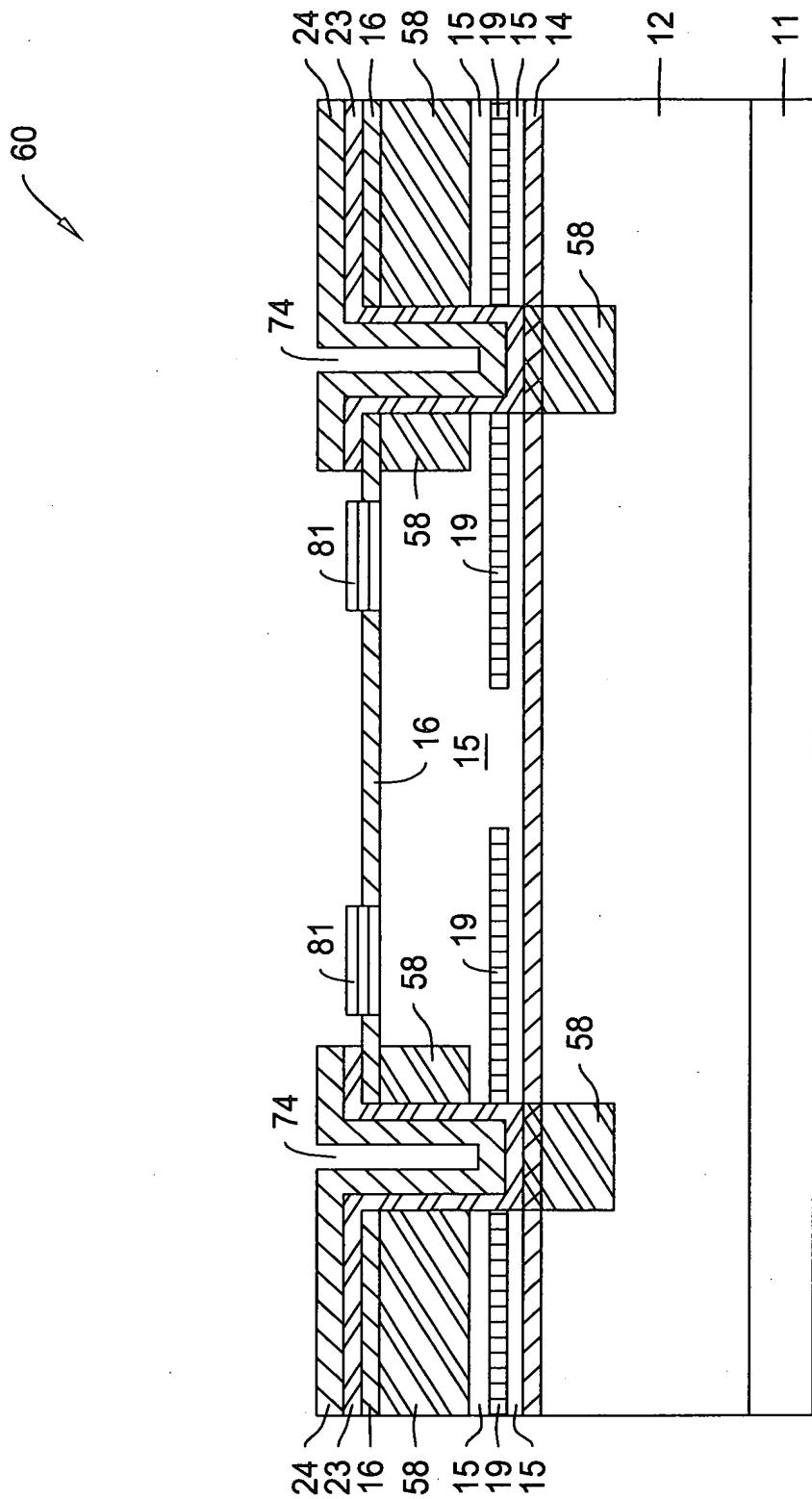


Figure 99

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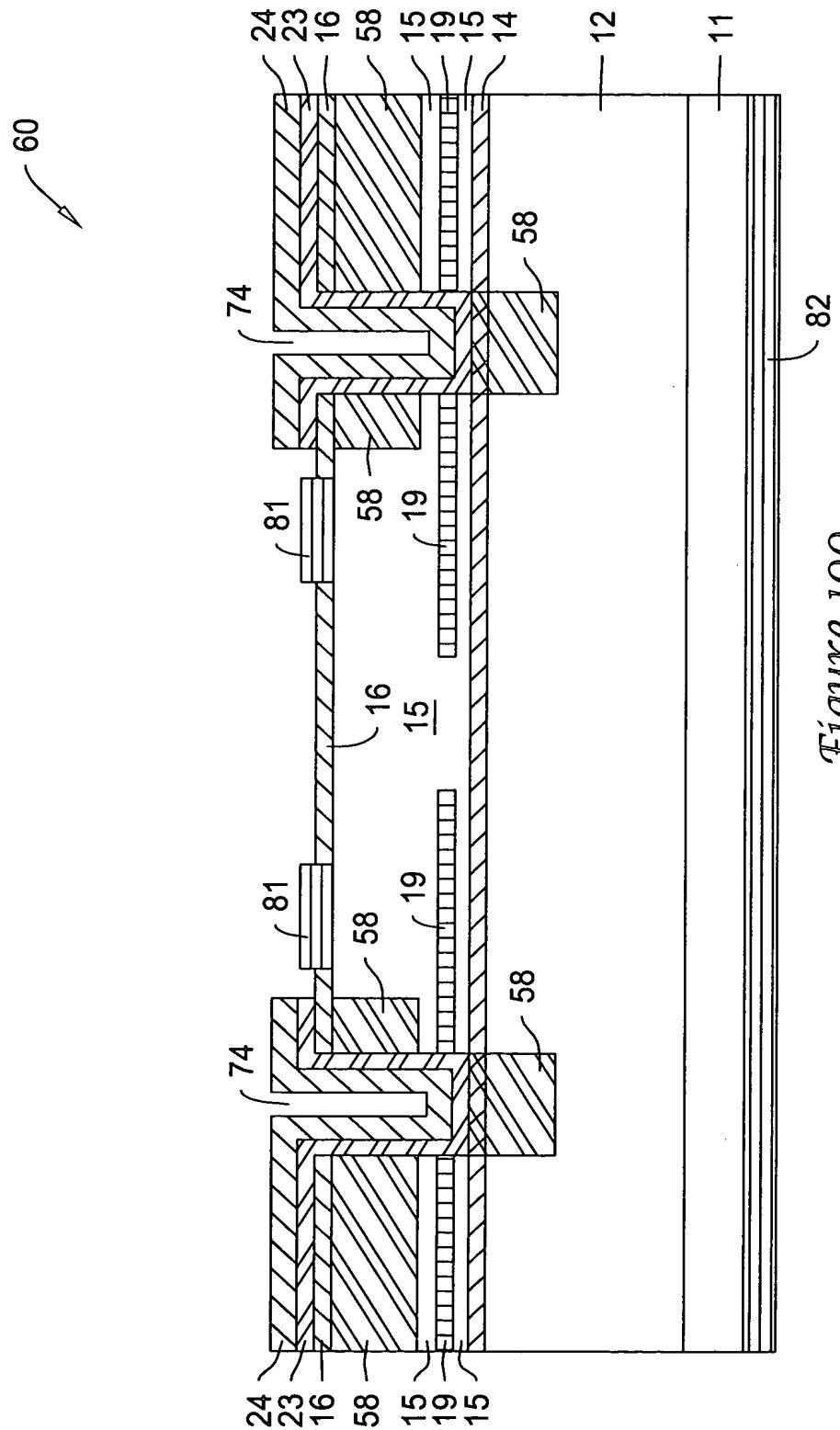


Figure 100

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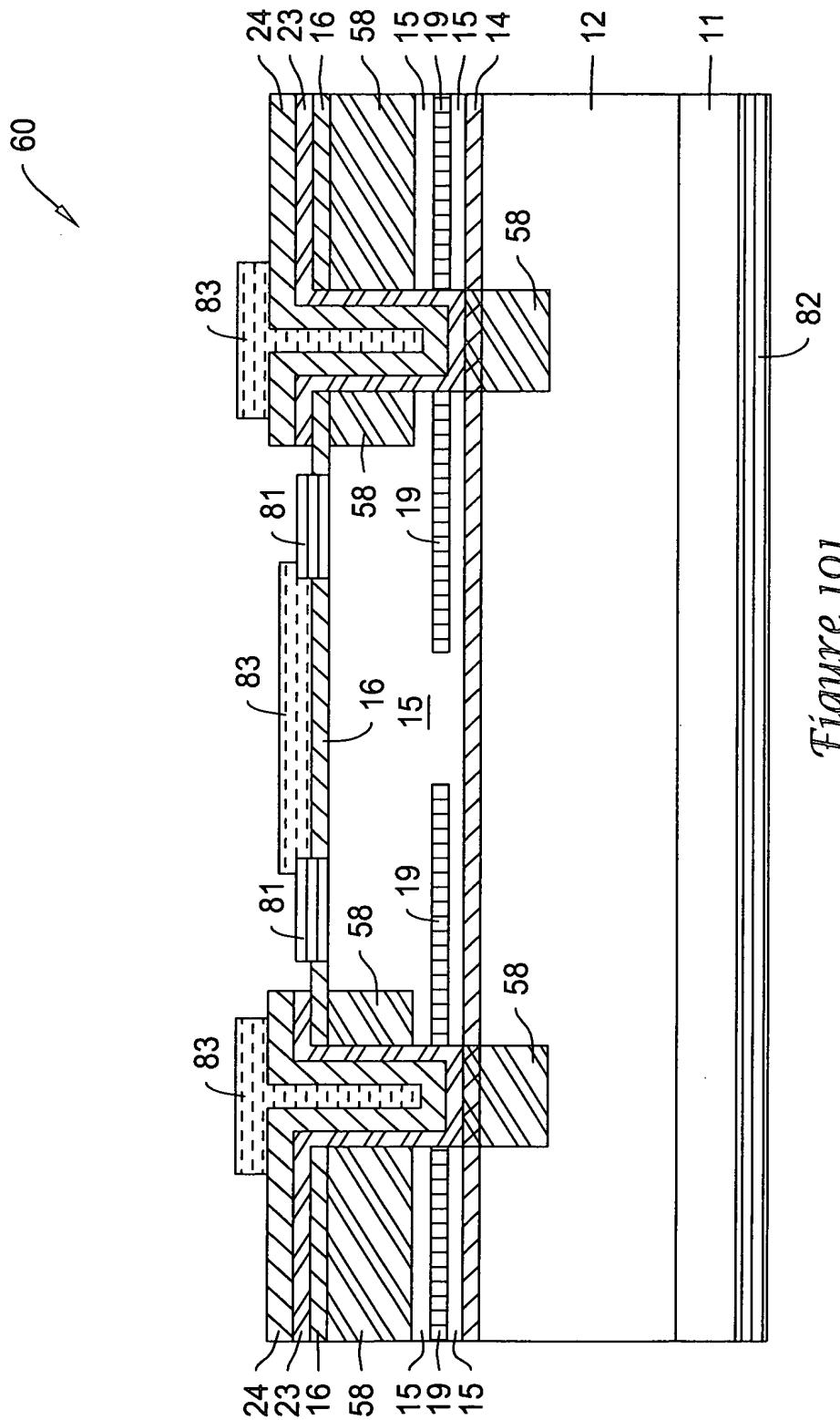


Figure 101

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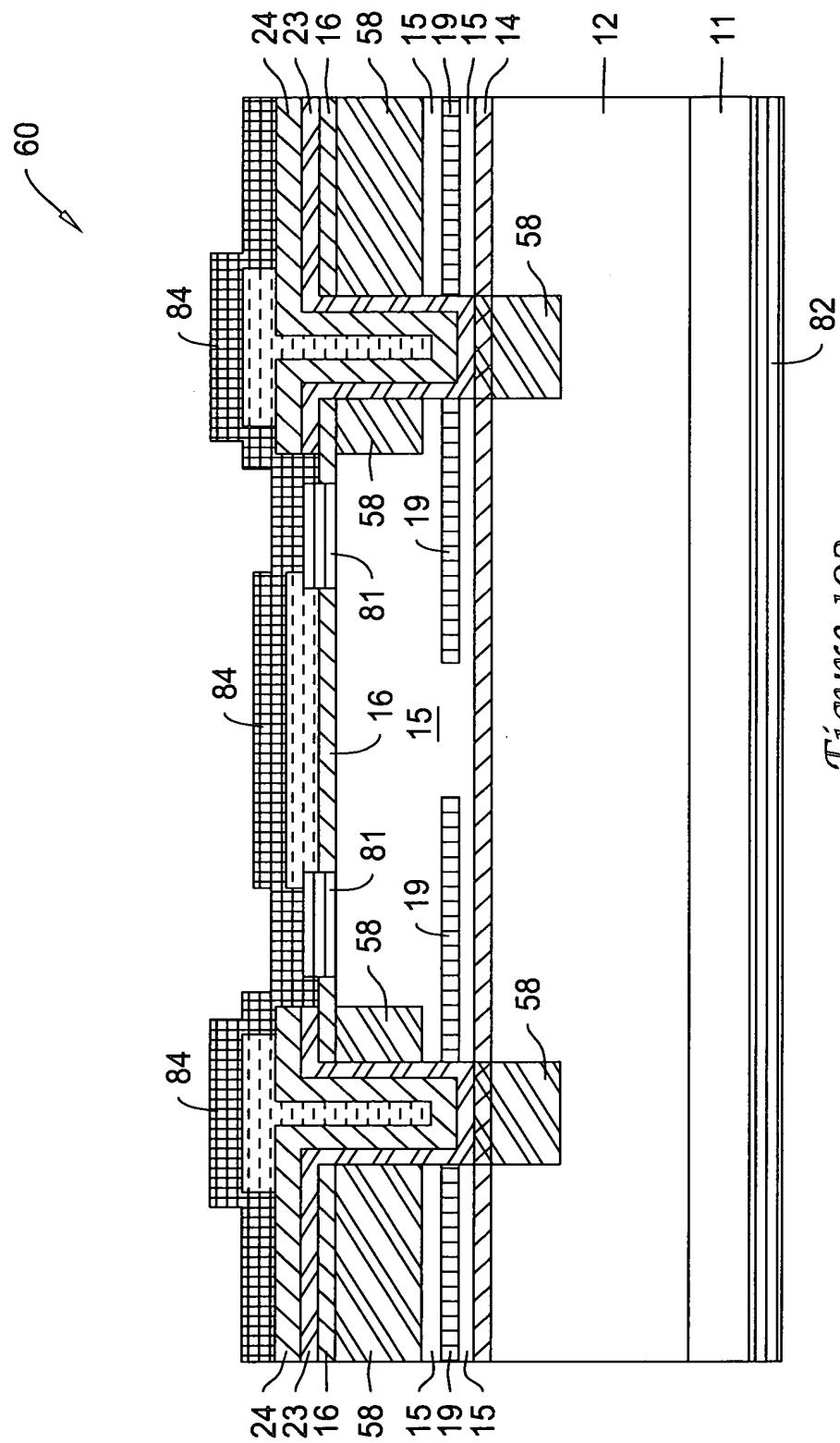


Figure 102

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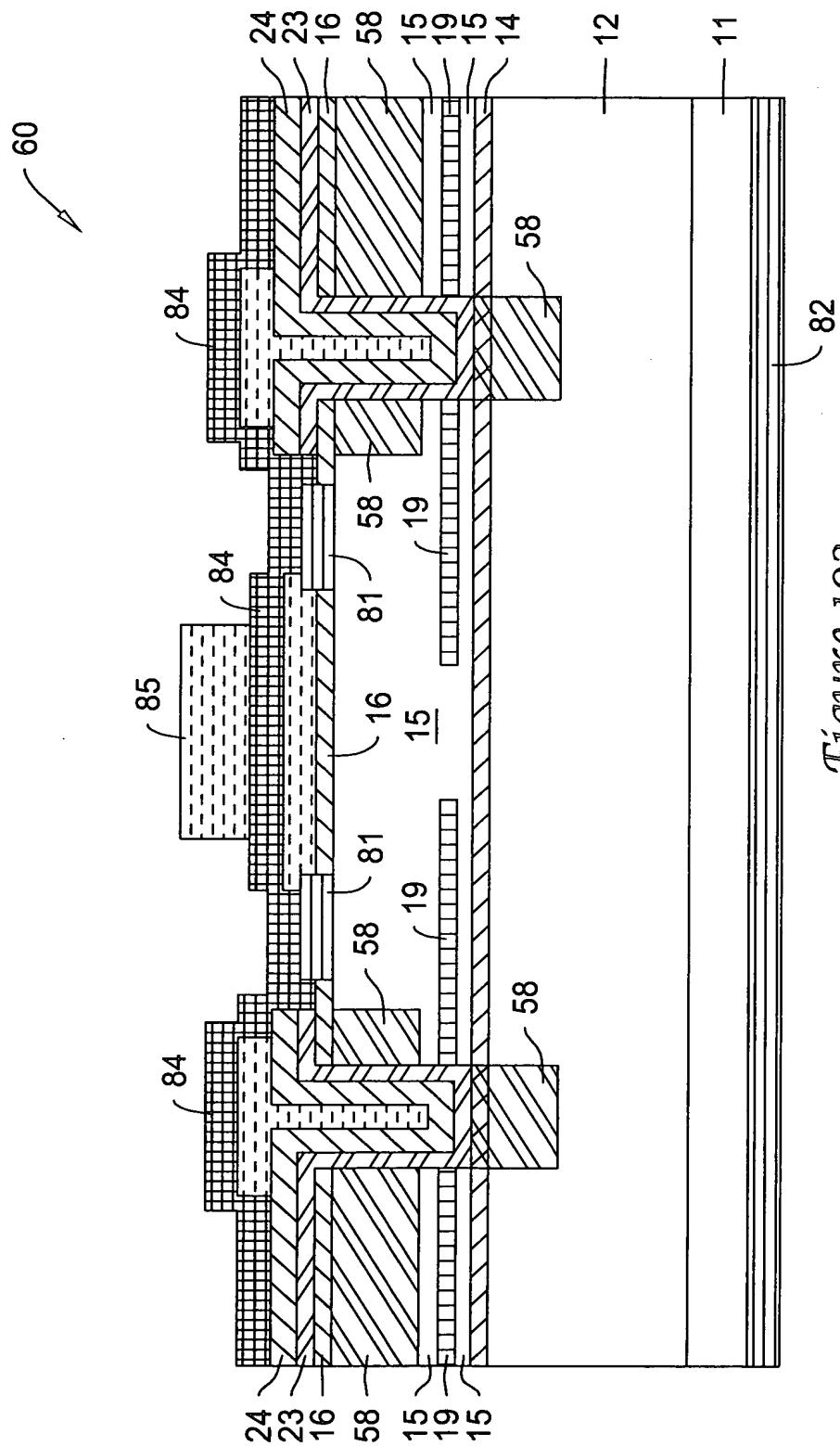


Figure 103

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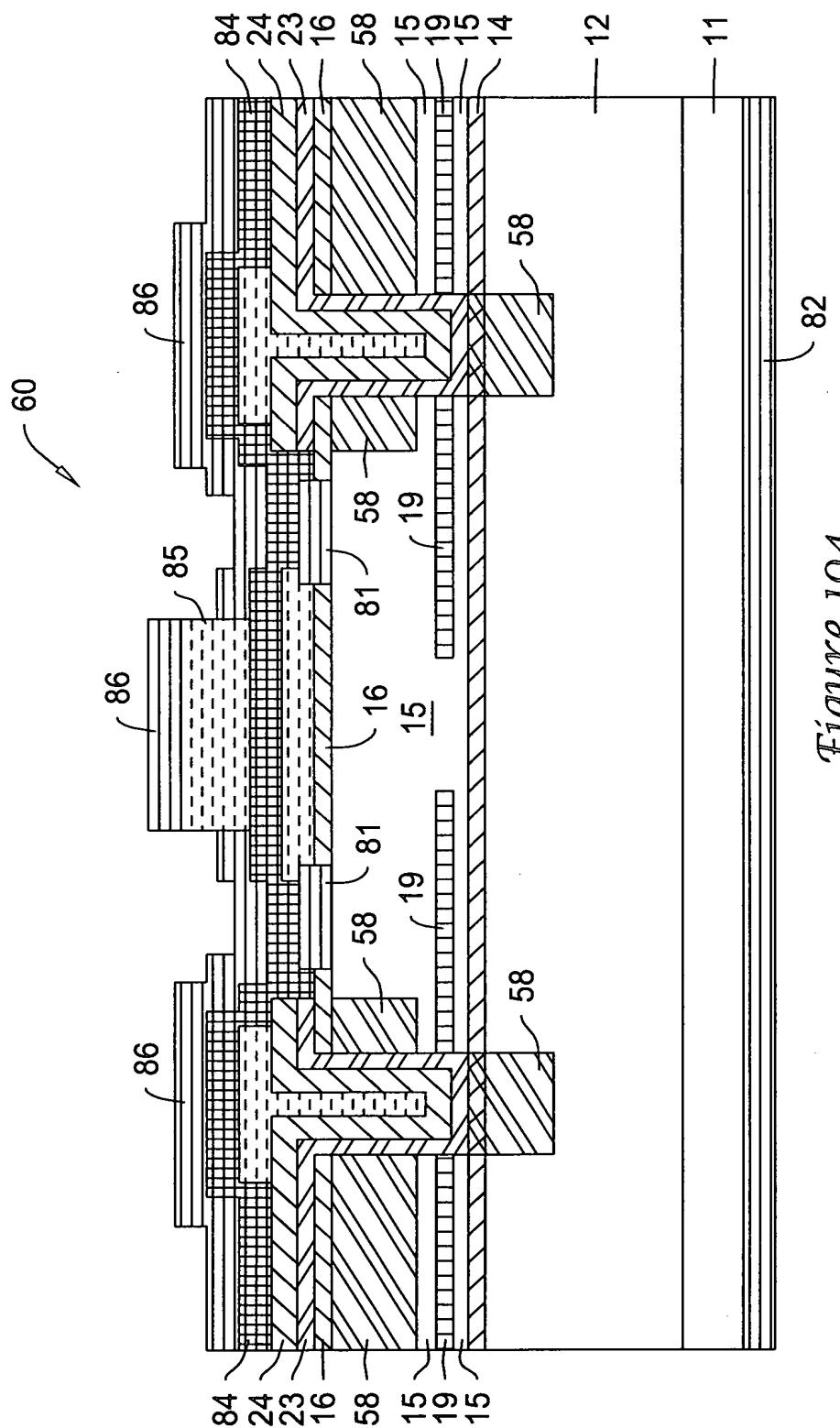


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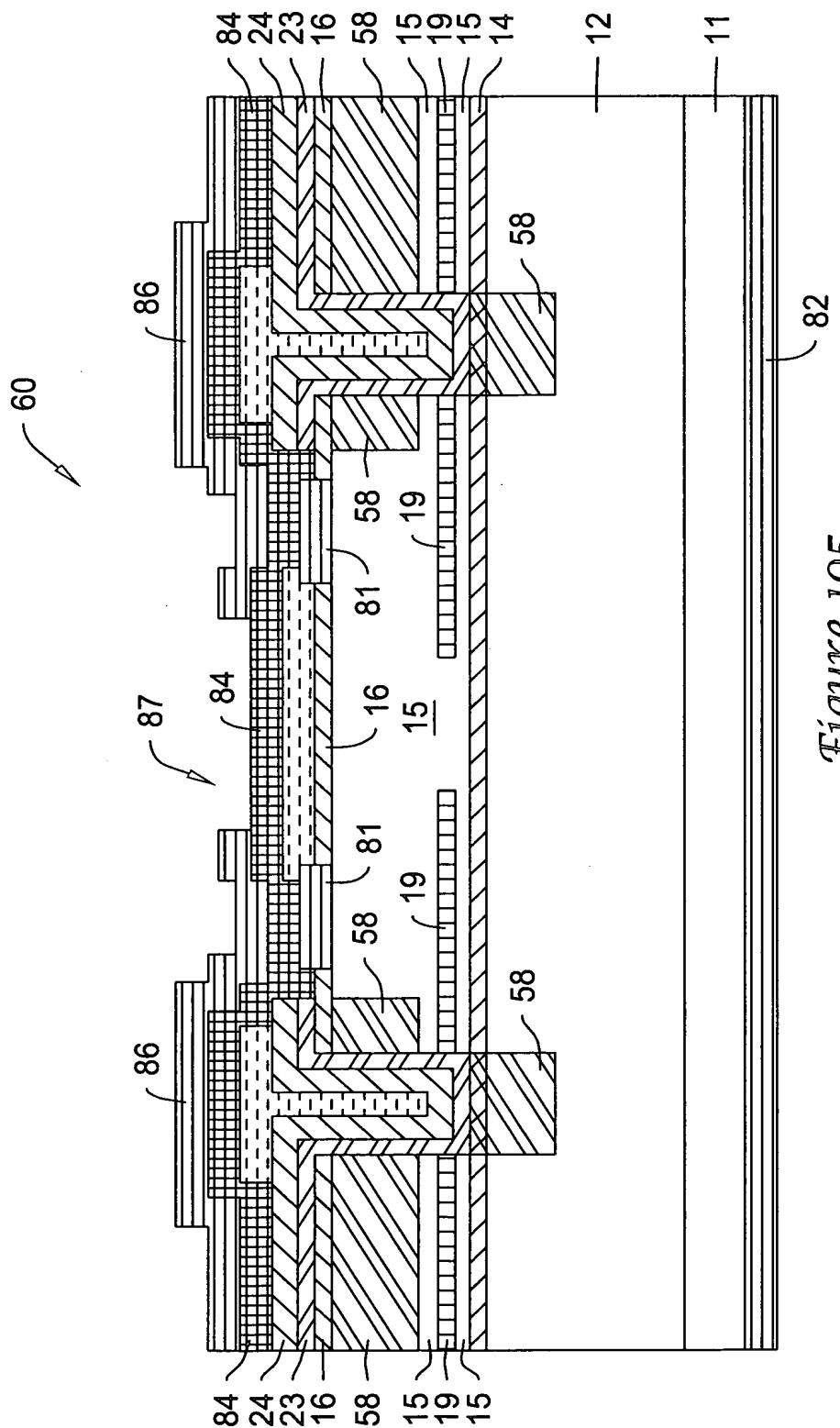


Figure 105

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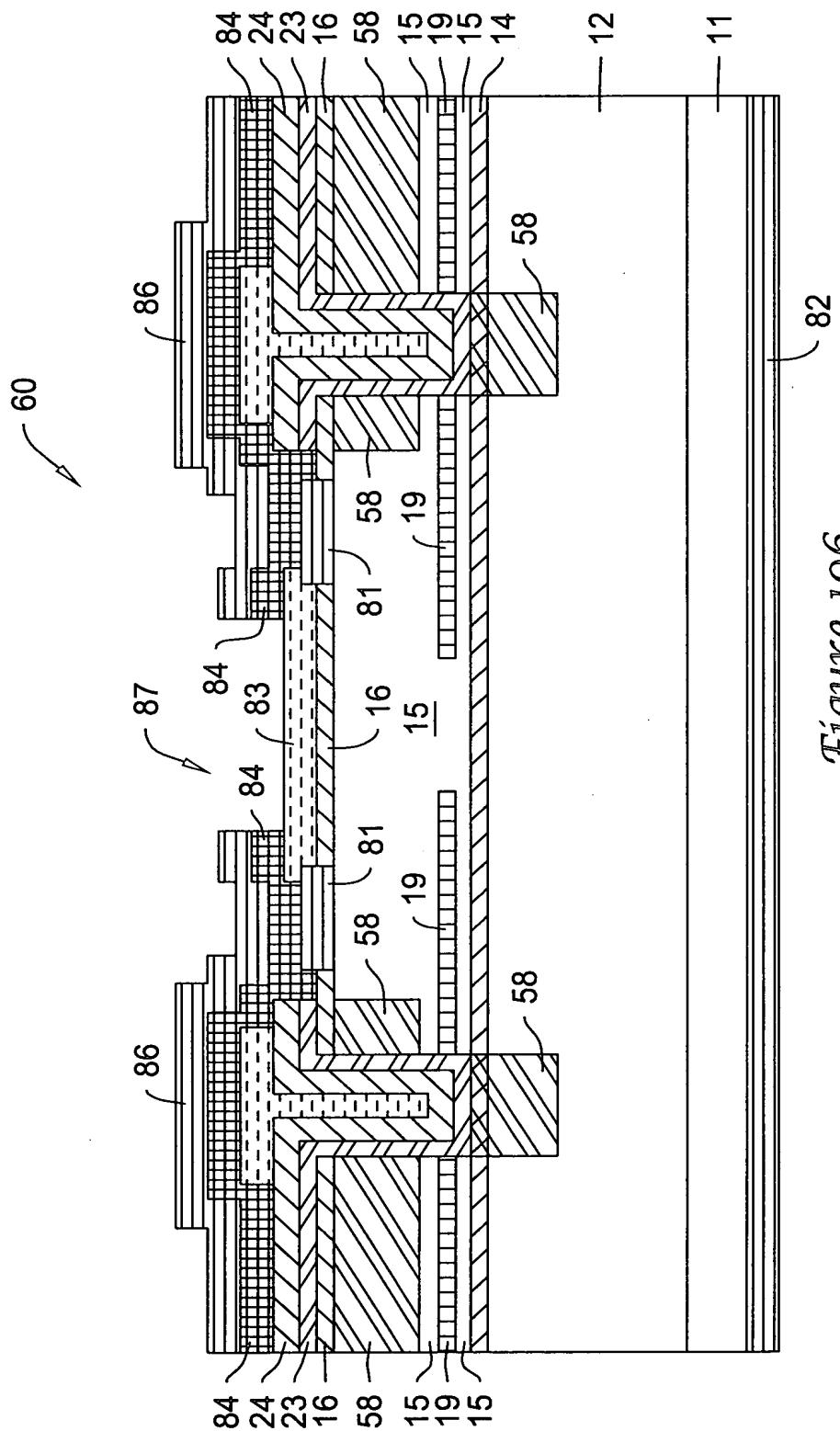


Figure 106

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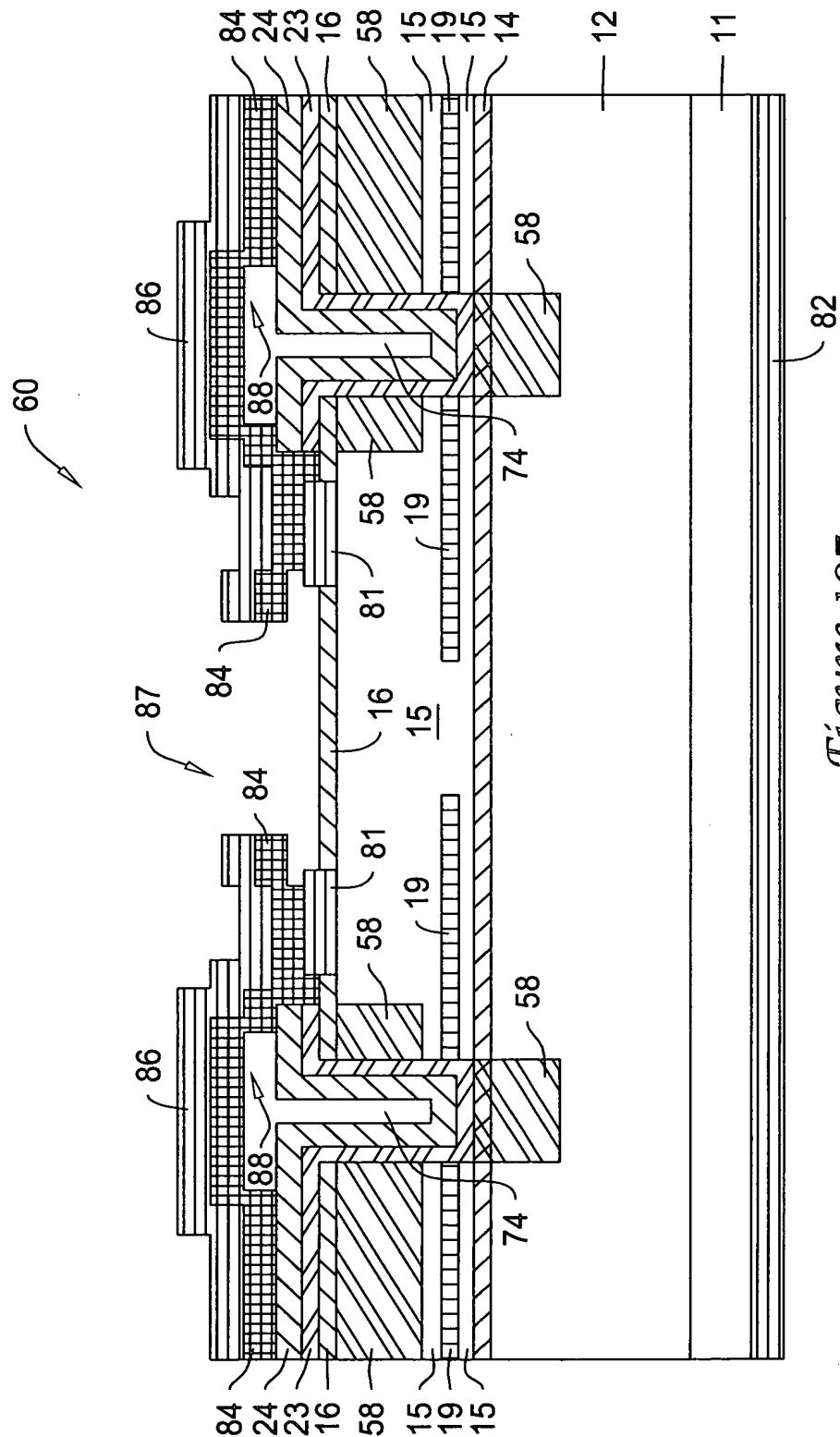


Figure 107 ^ 82

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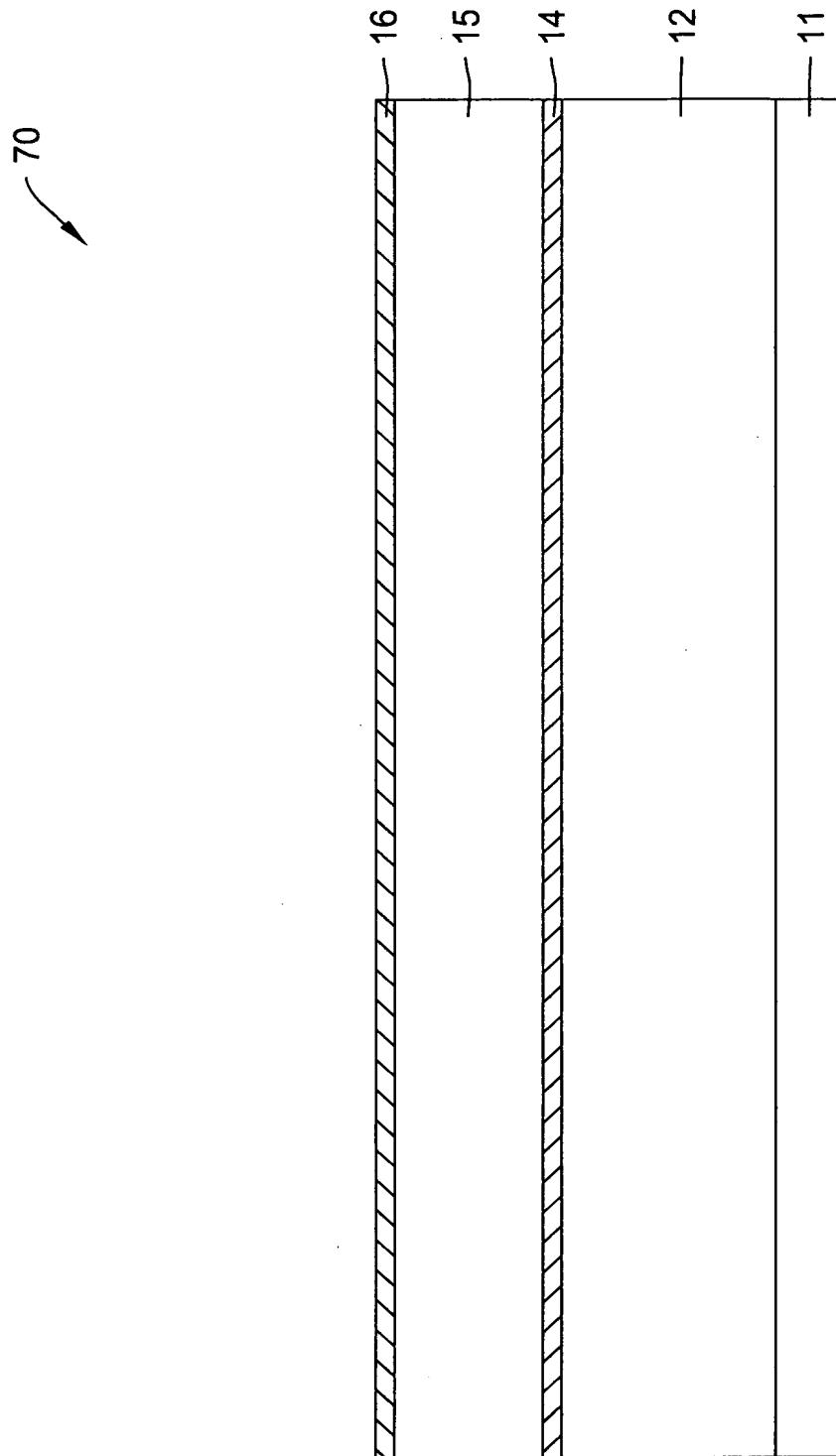


Figure 108

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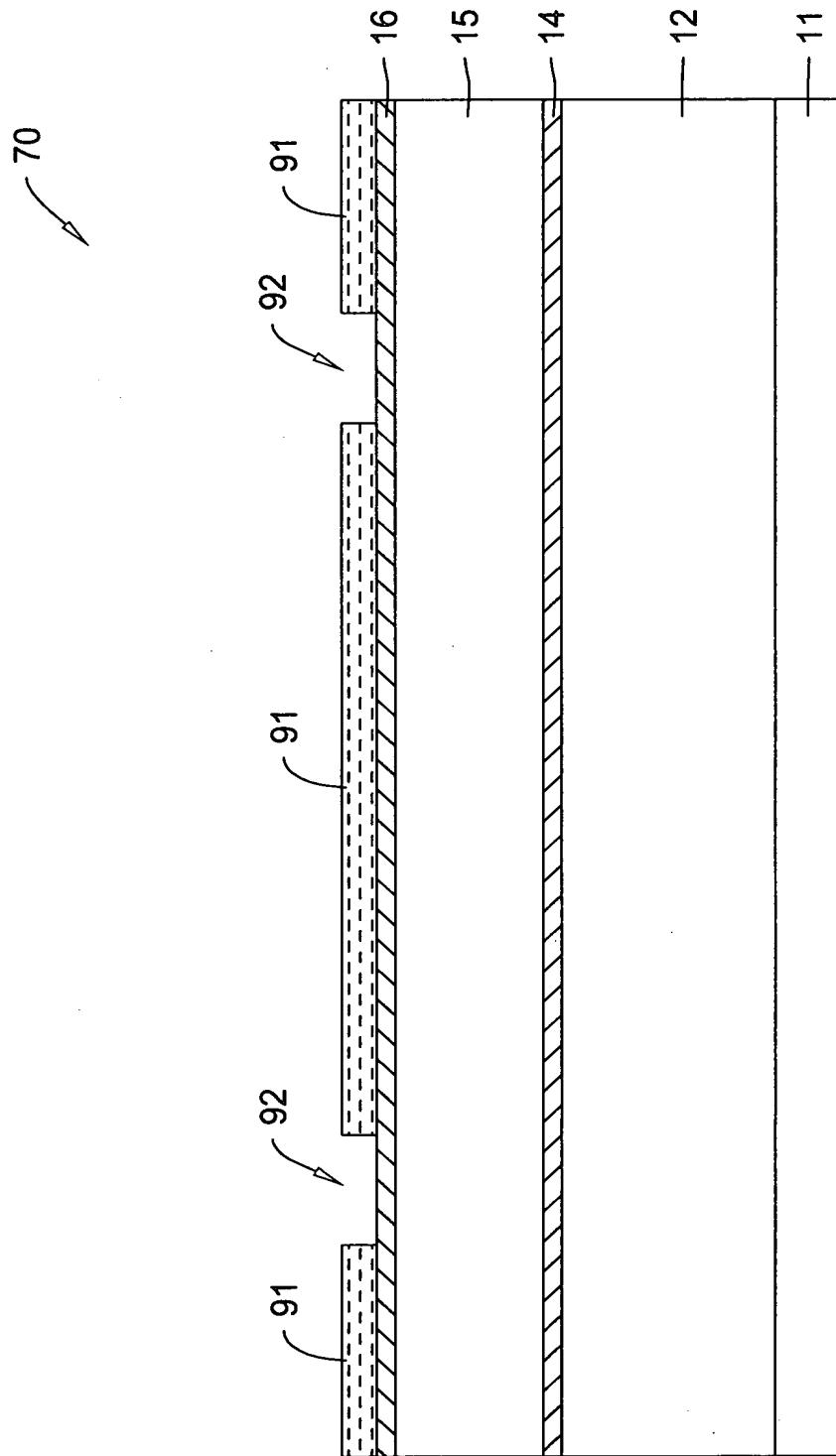


Figure 109

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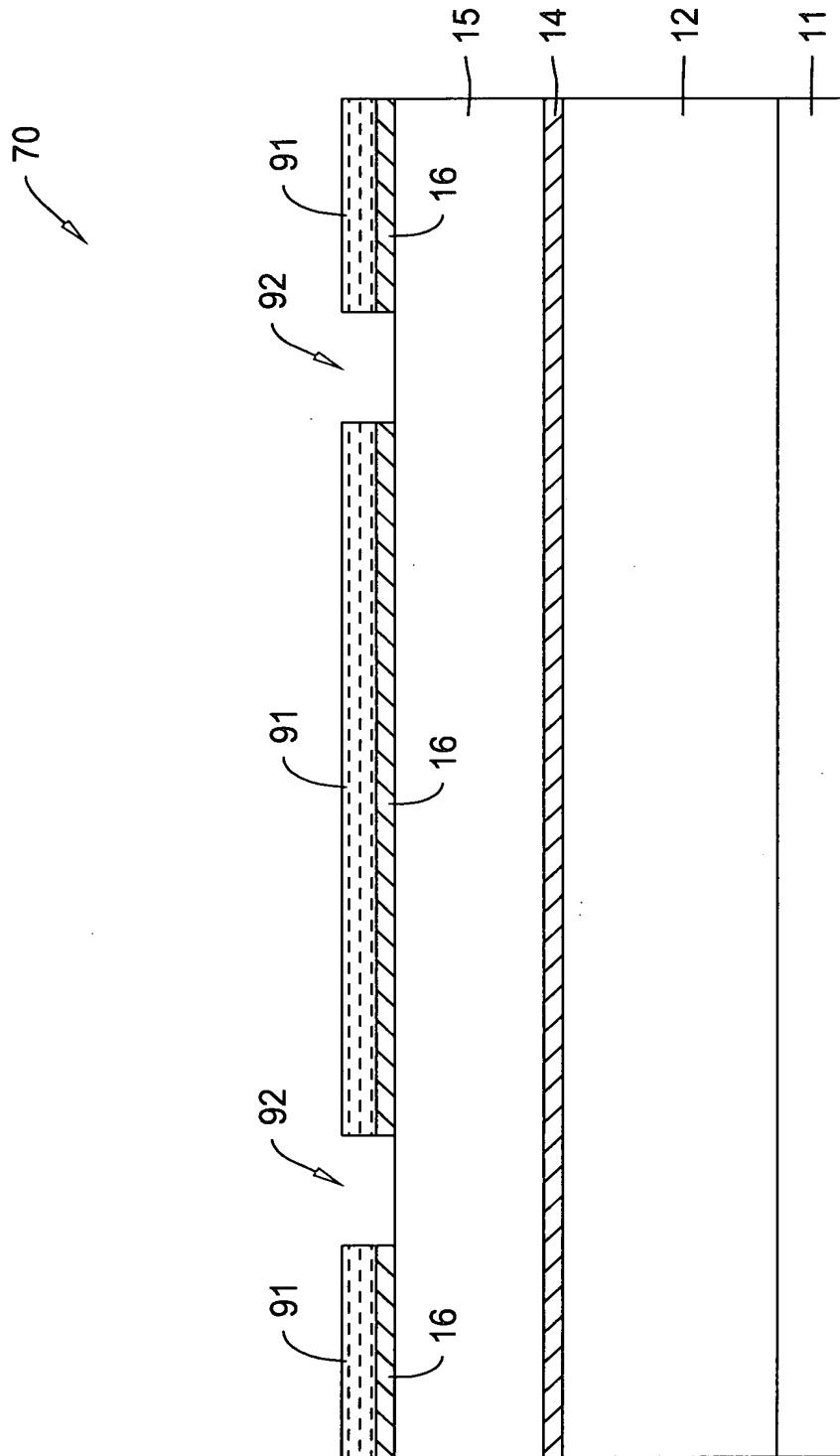


Figure 110

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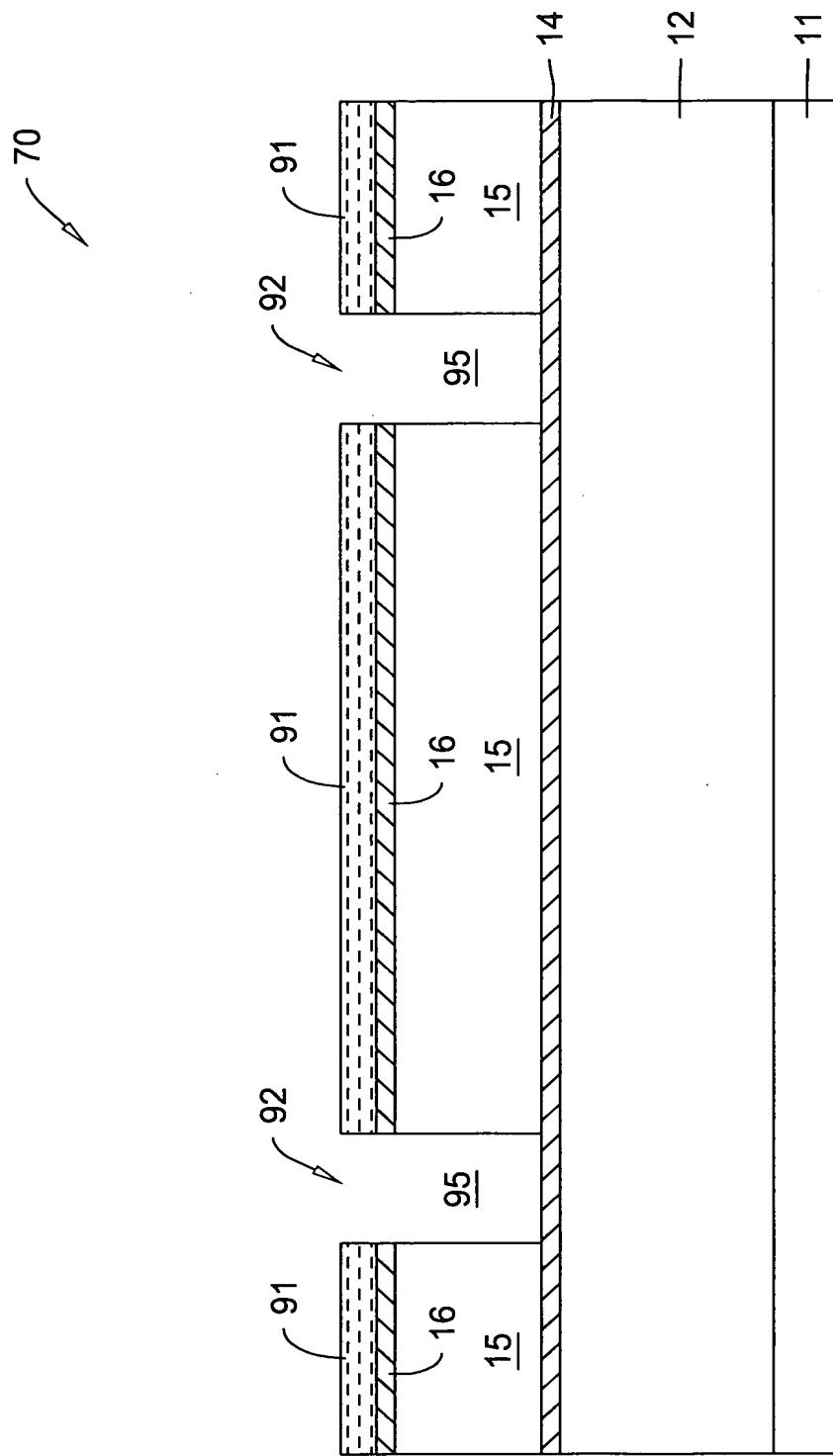


Figure III

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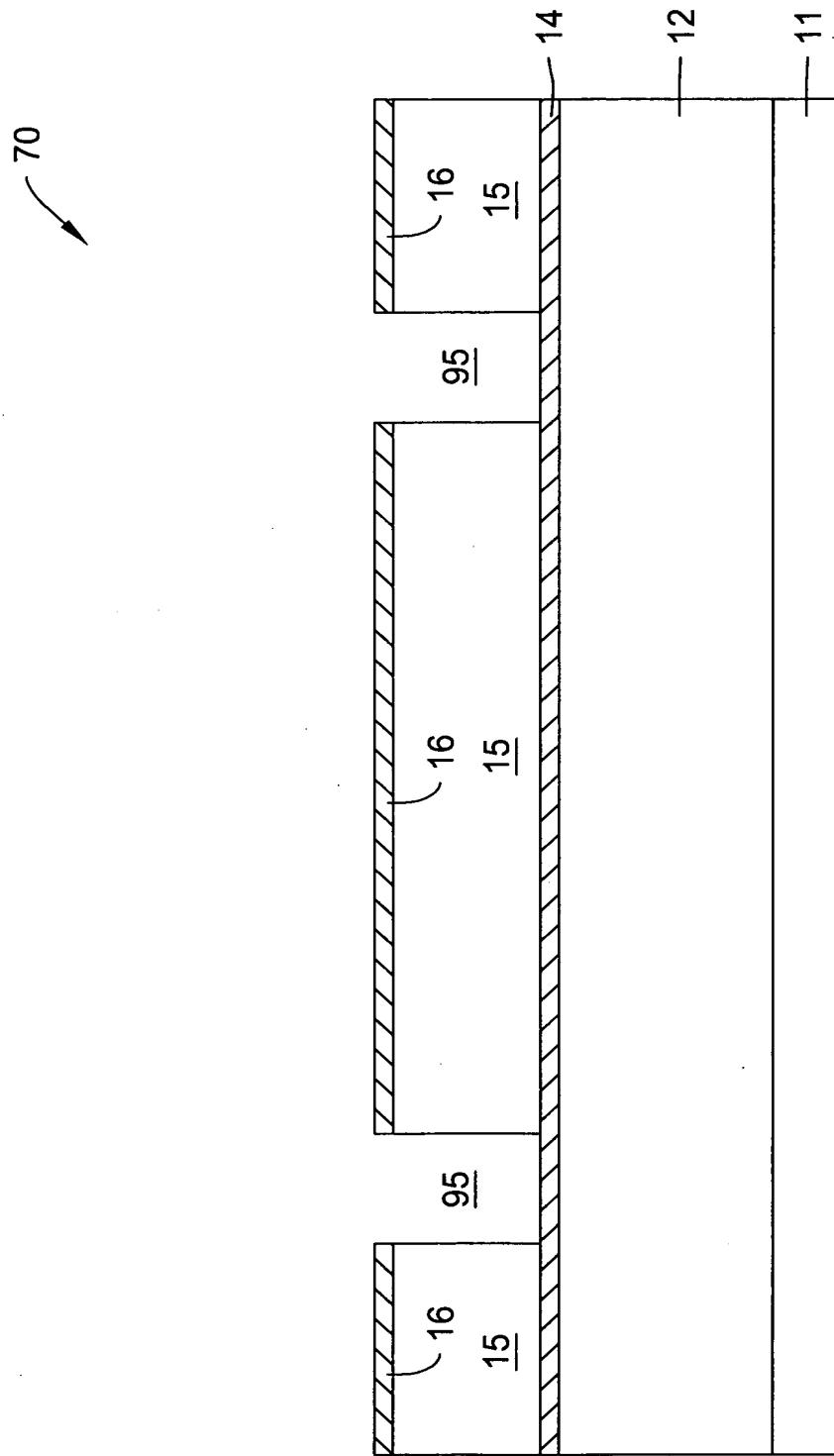


Figure 112

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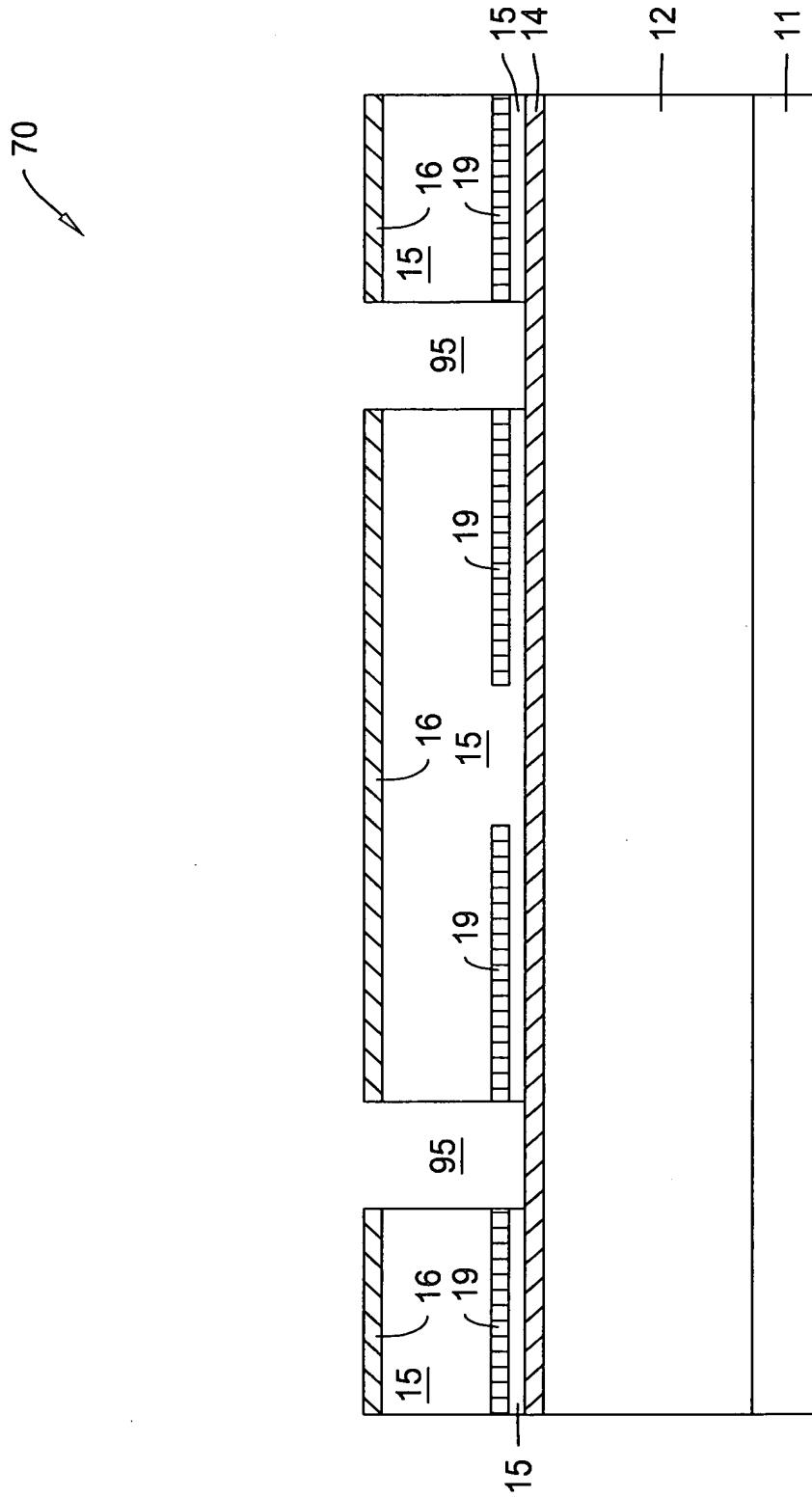


Figure 113

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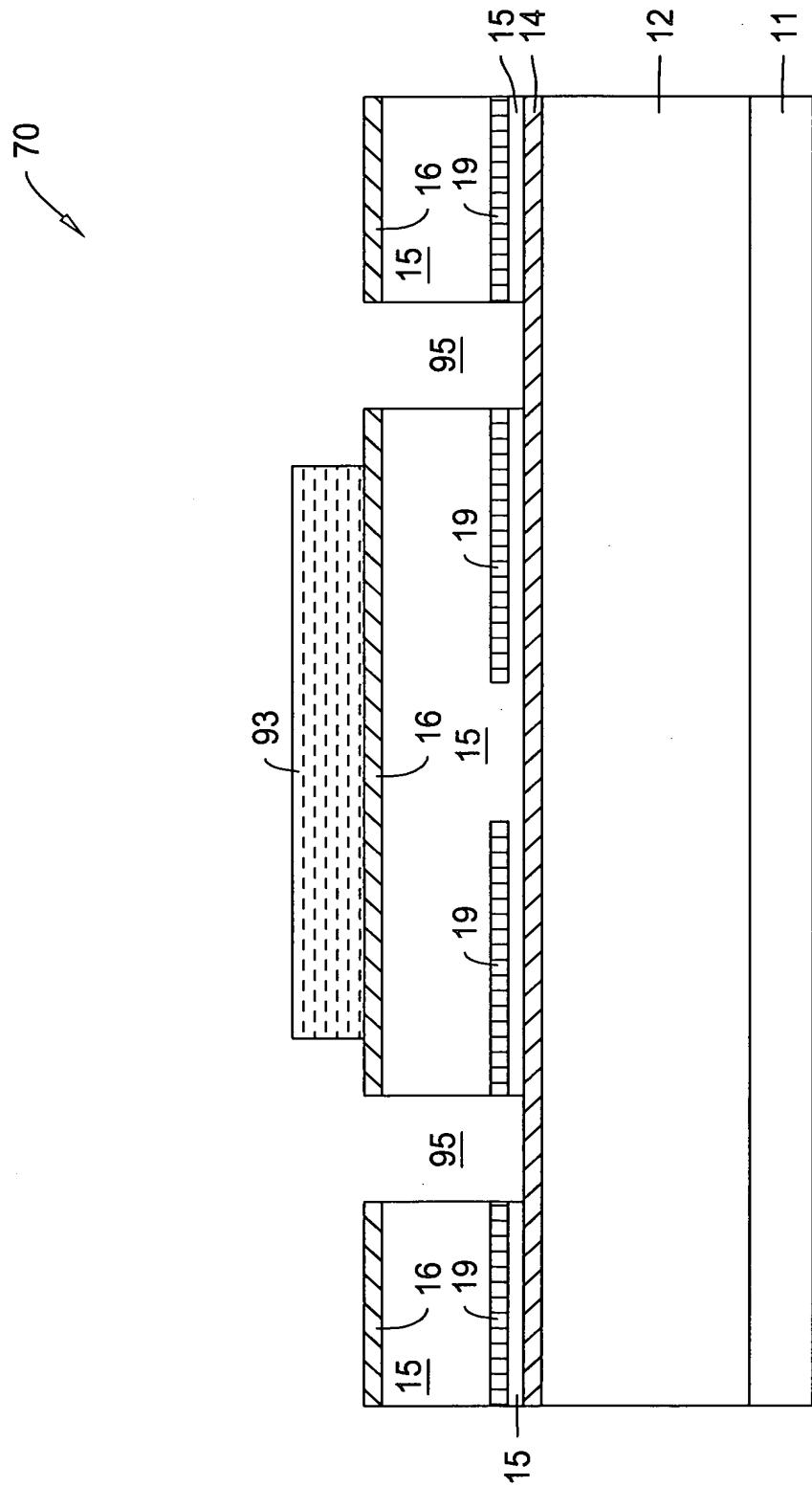


Figure 114

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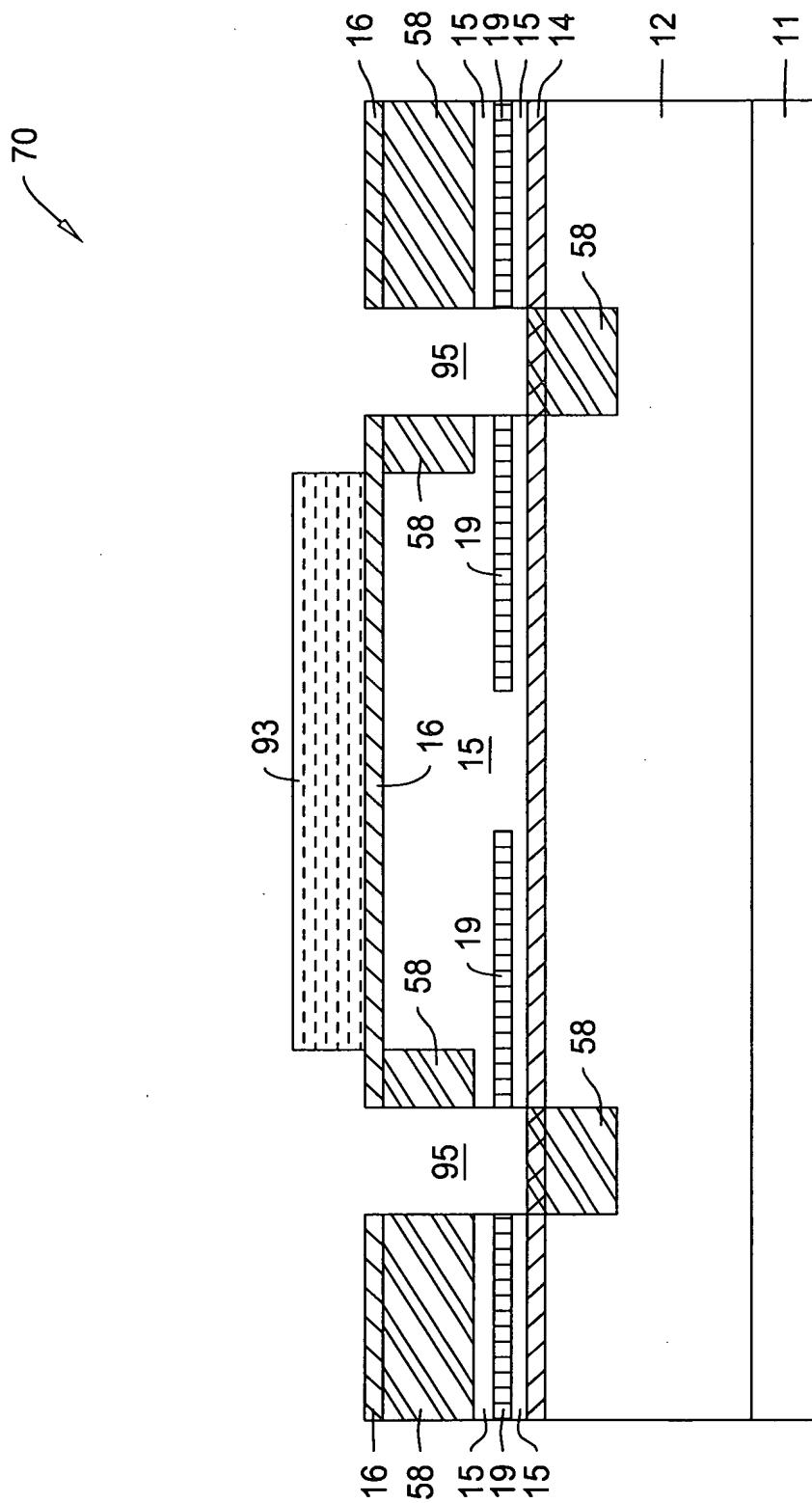


Figure 115

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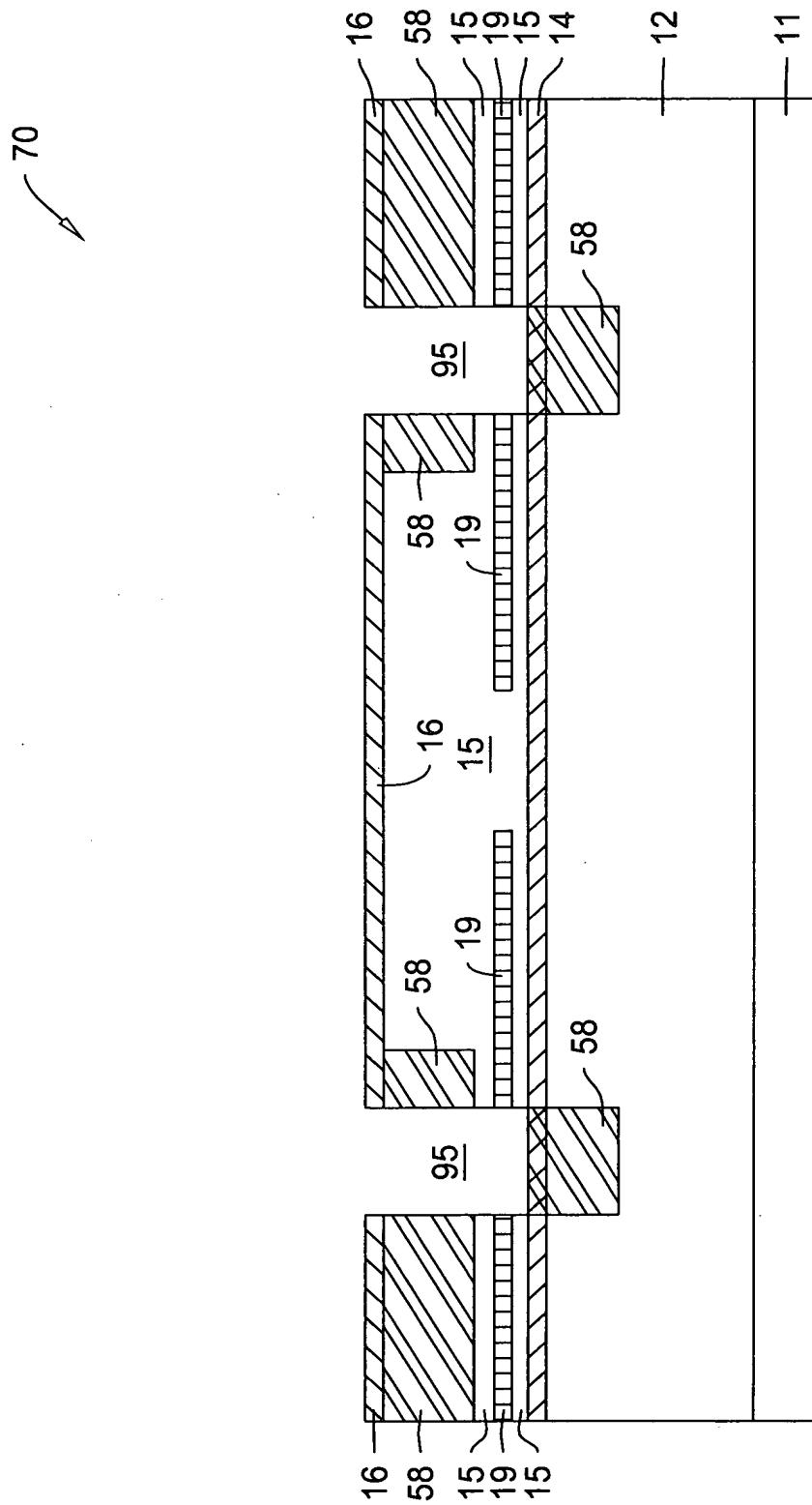


Figure 116

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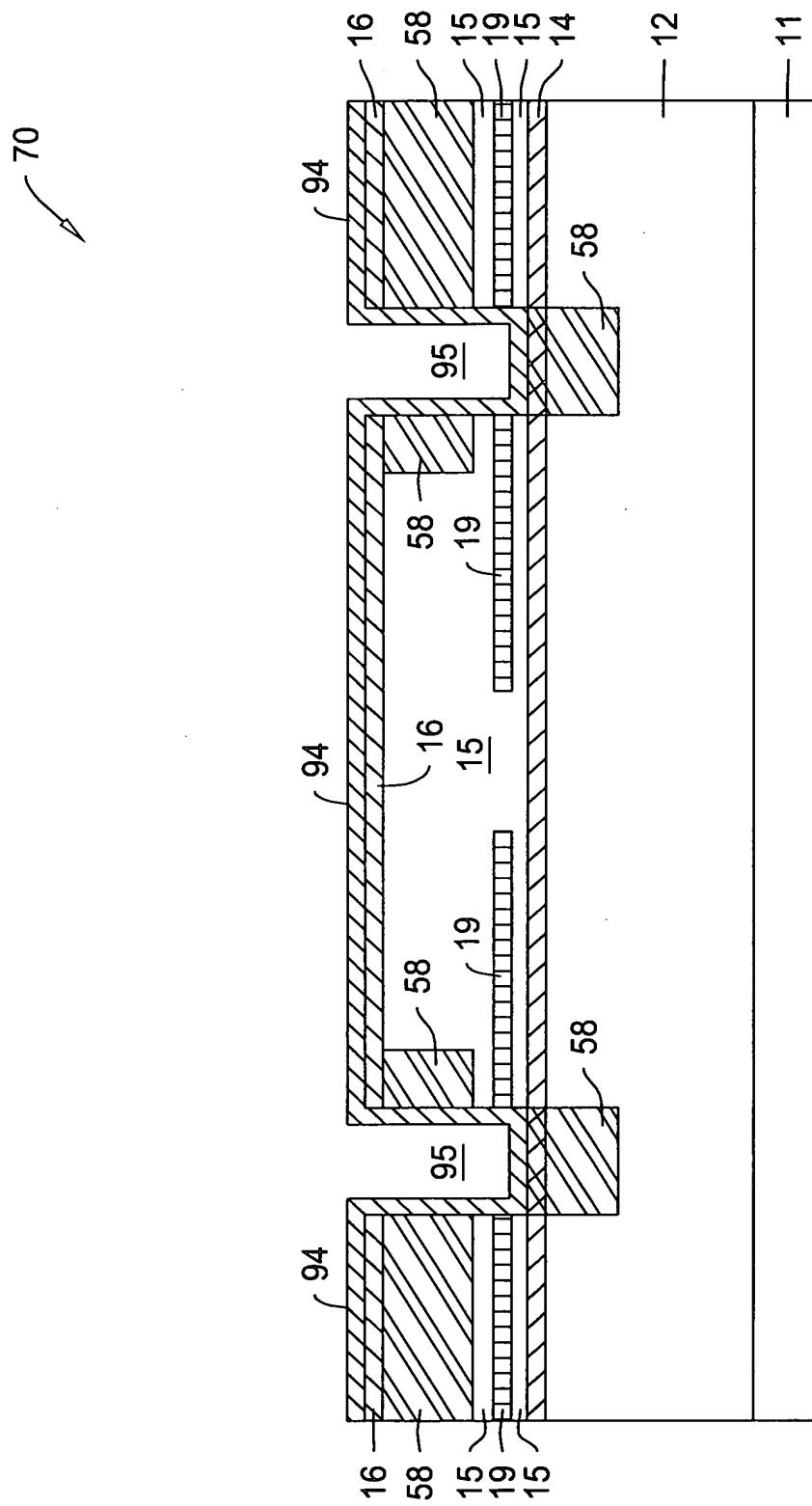


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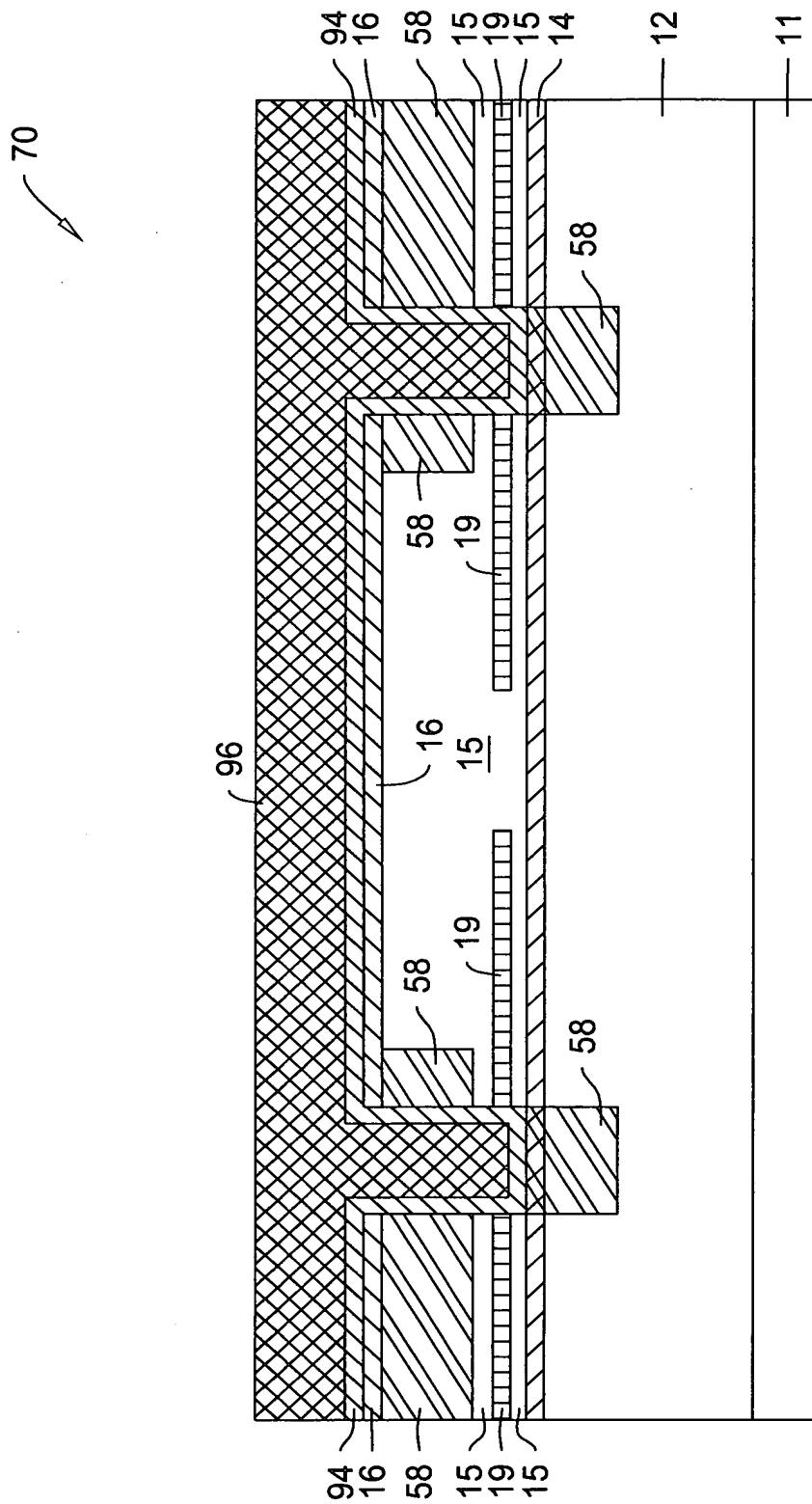


Figure 118

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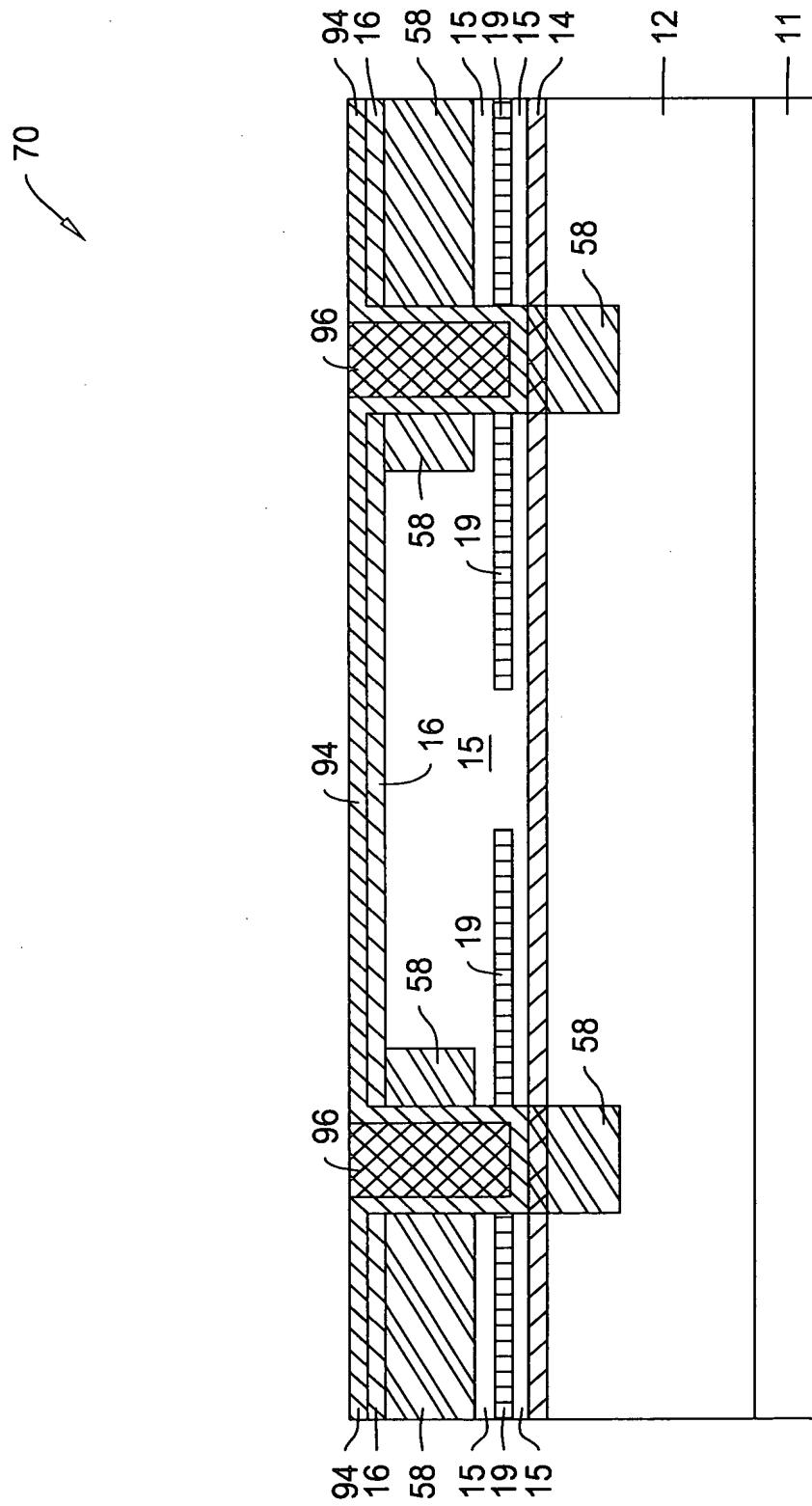


Figure 119

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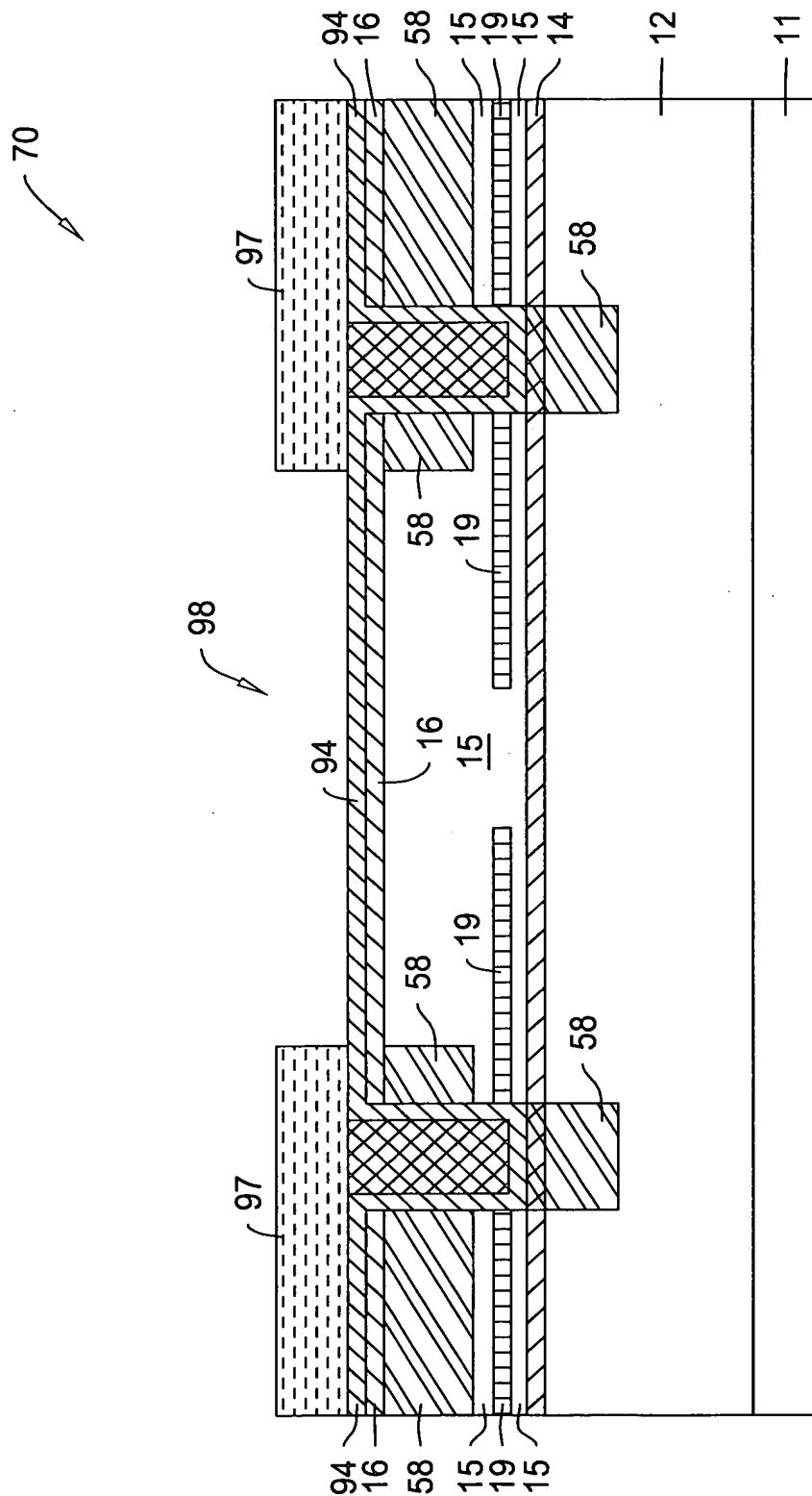


Figure 120

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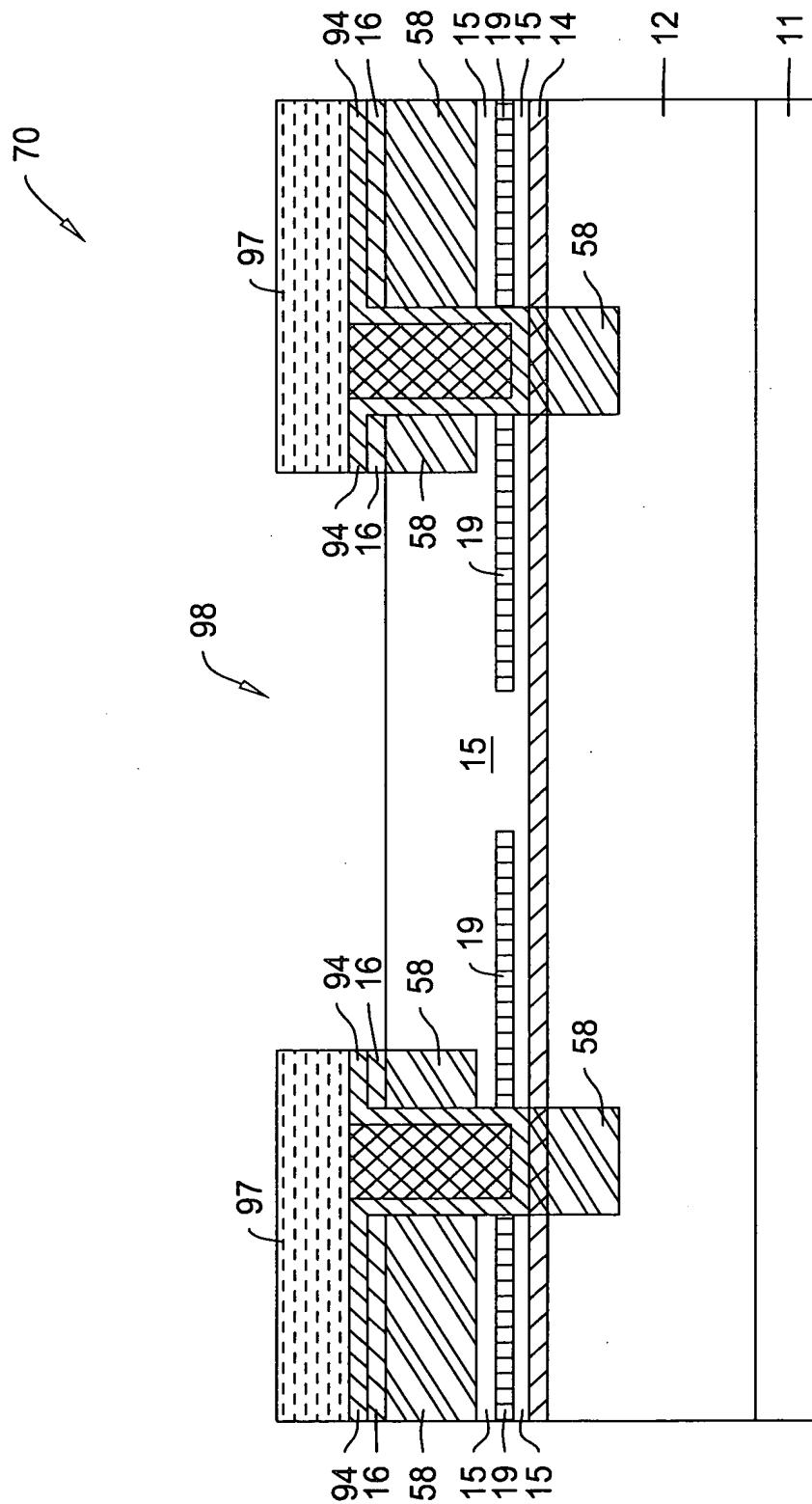


Figure 121

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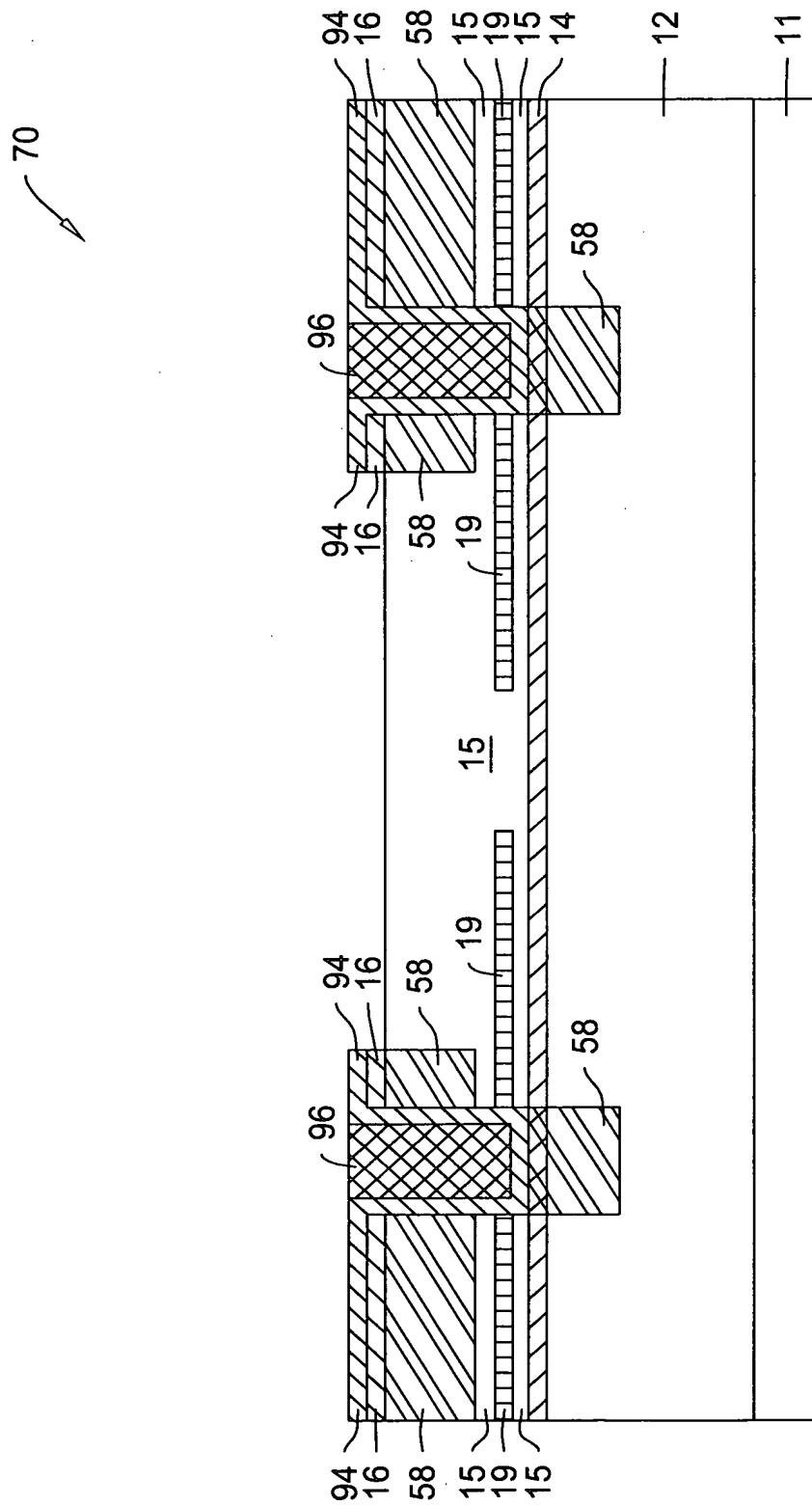


Figure 122

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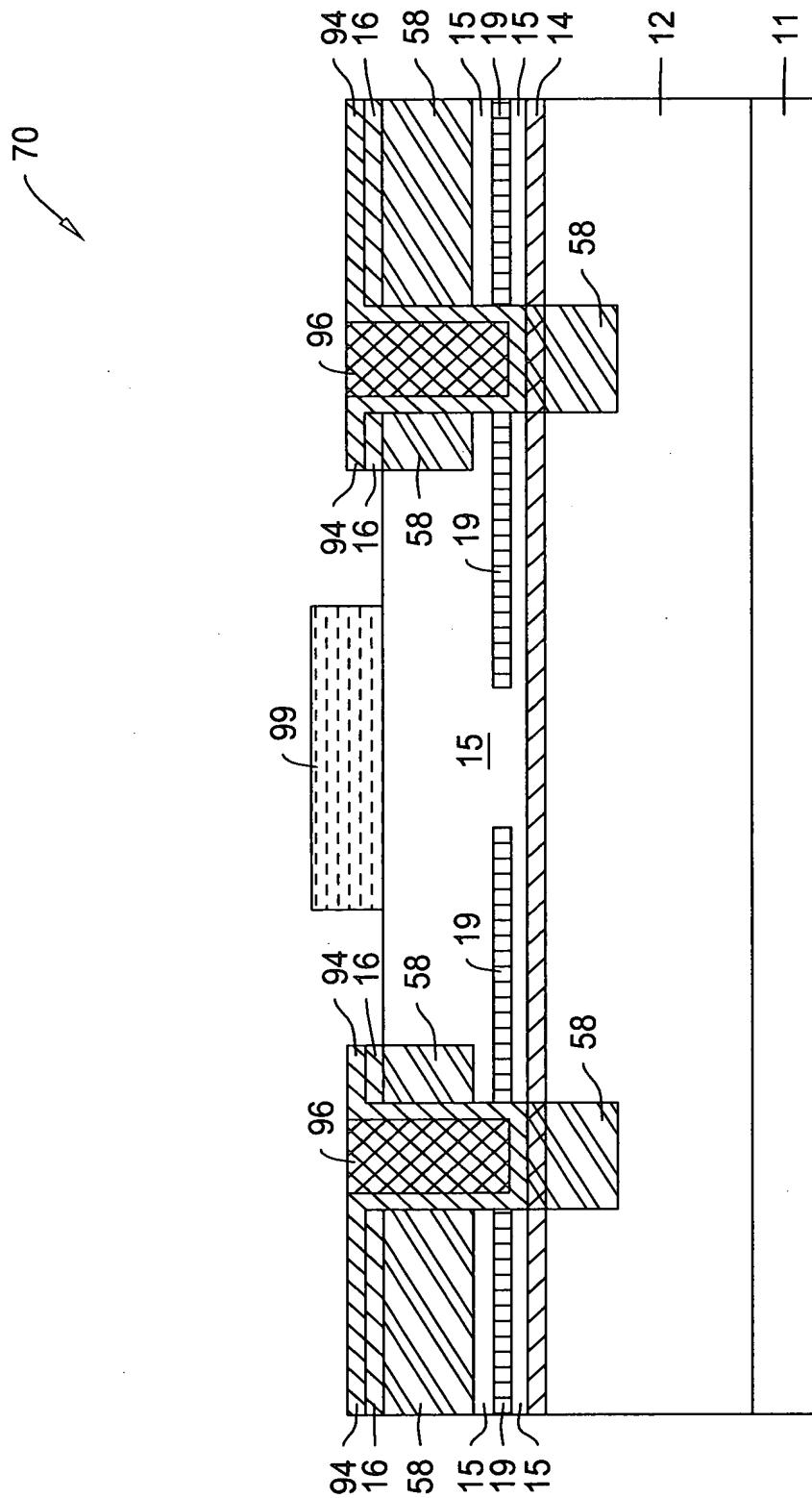


Figure 123

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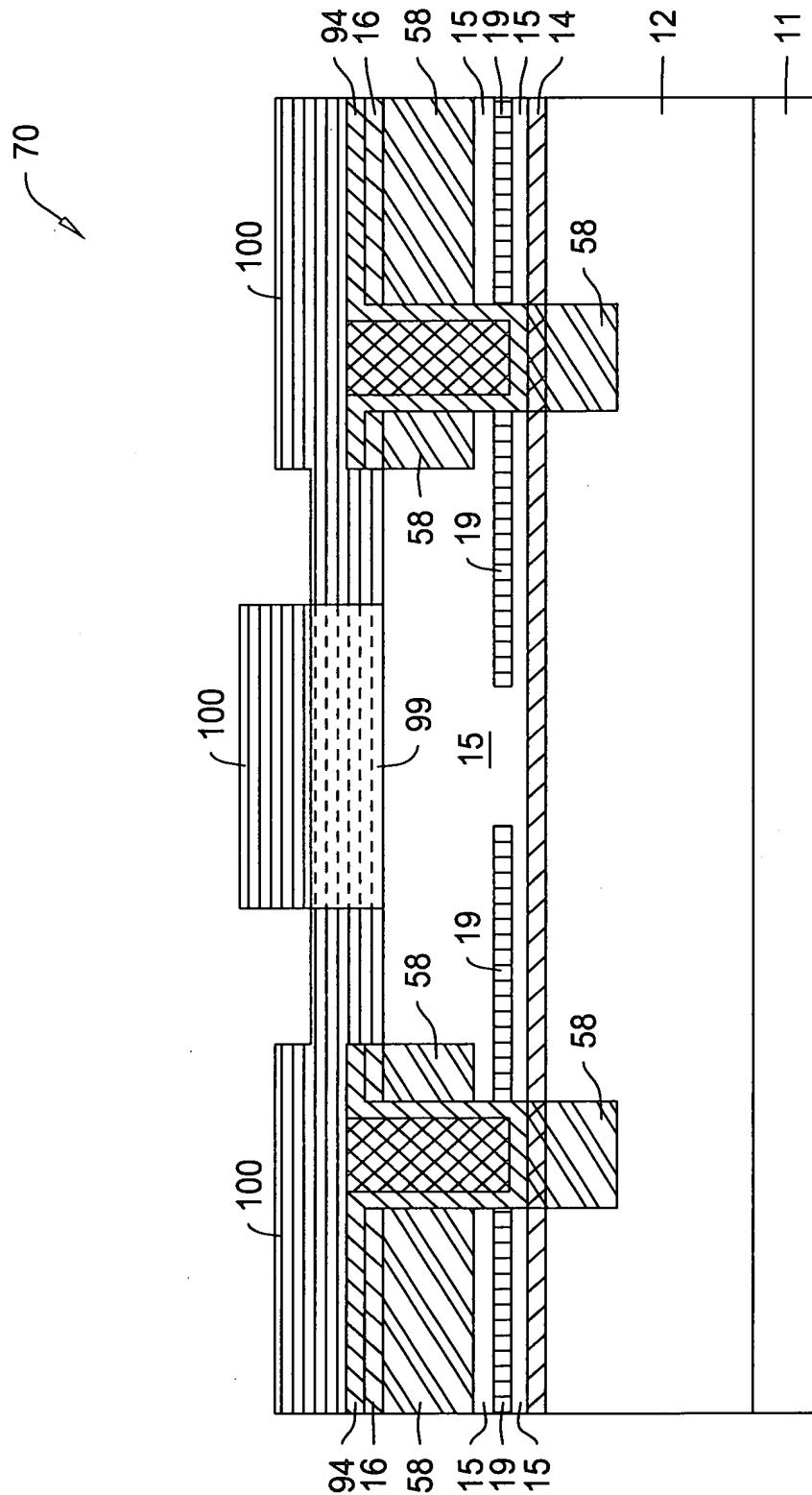


Figure 124

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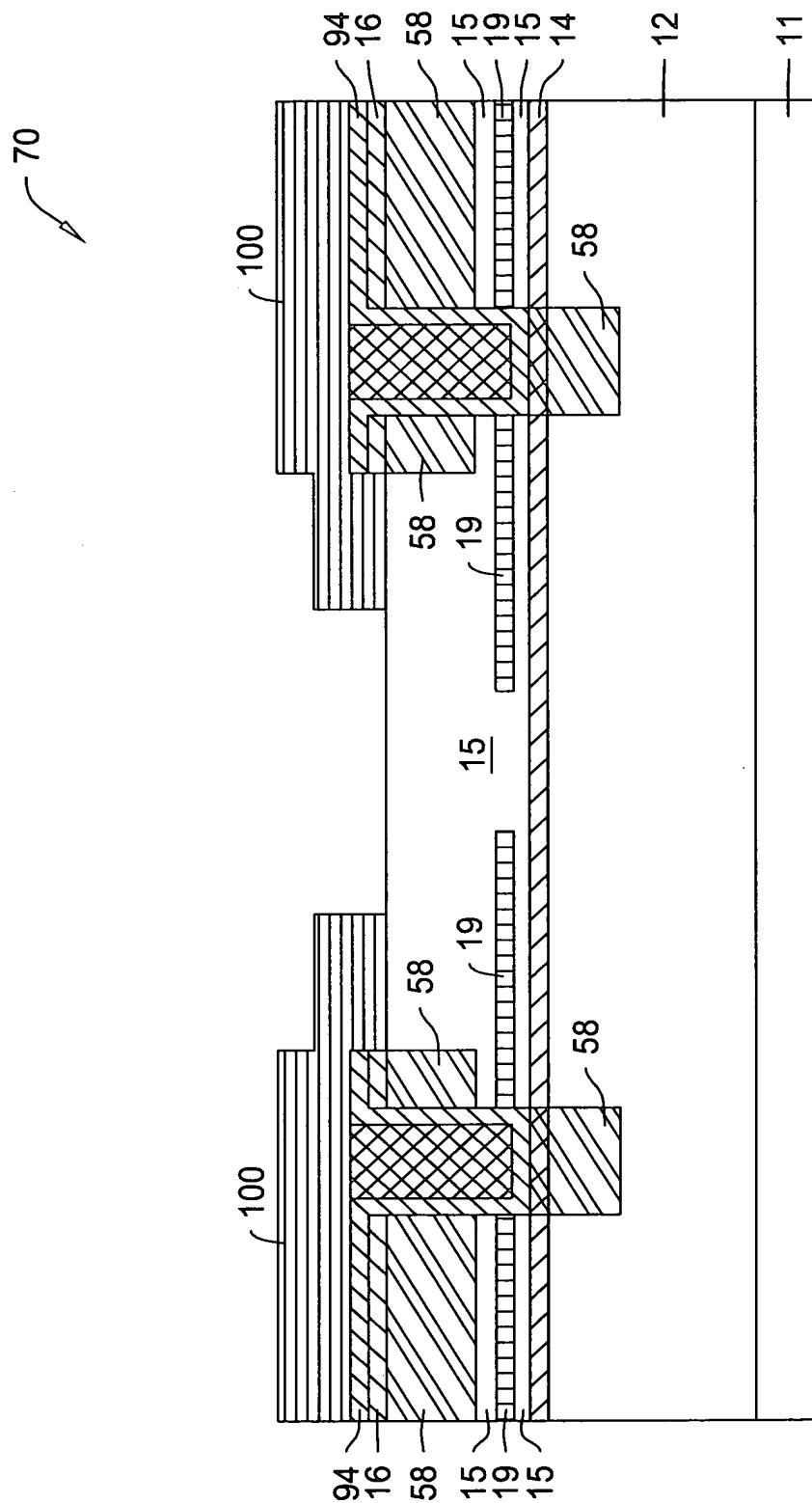
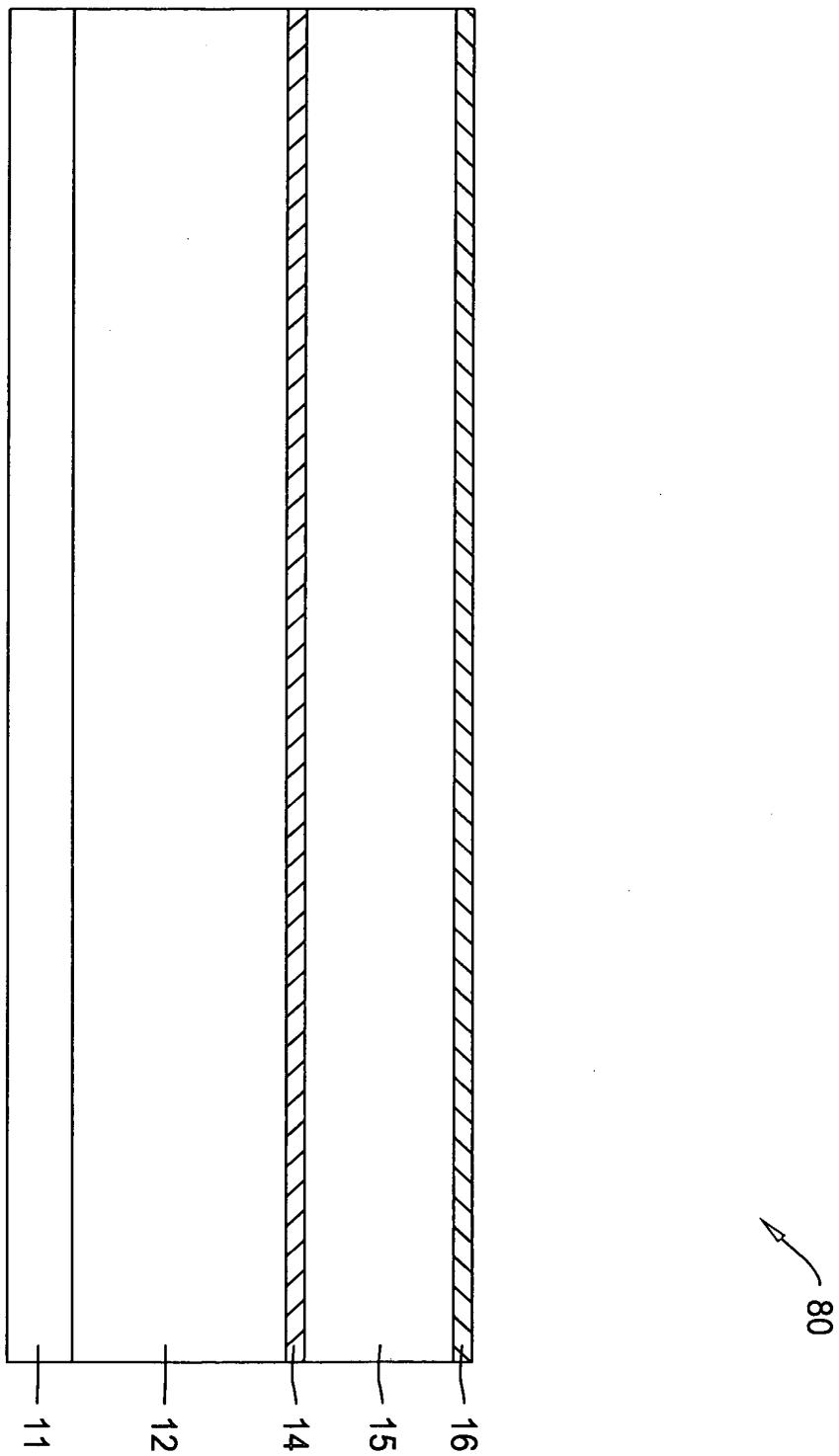


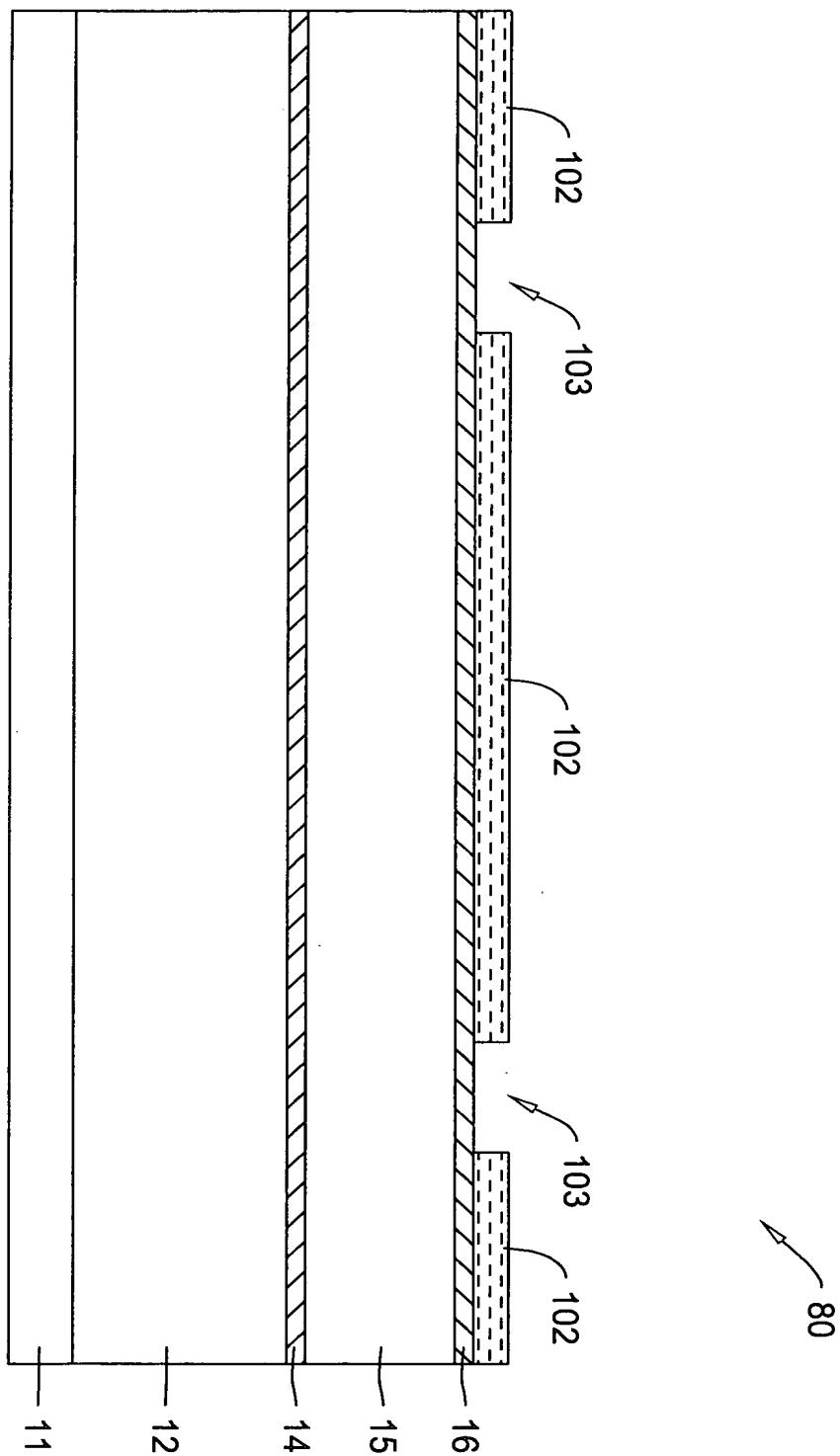
Figure 125

Figure 127



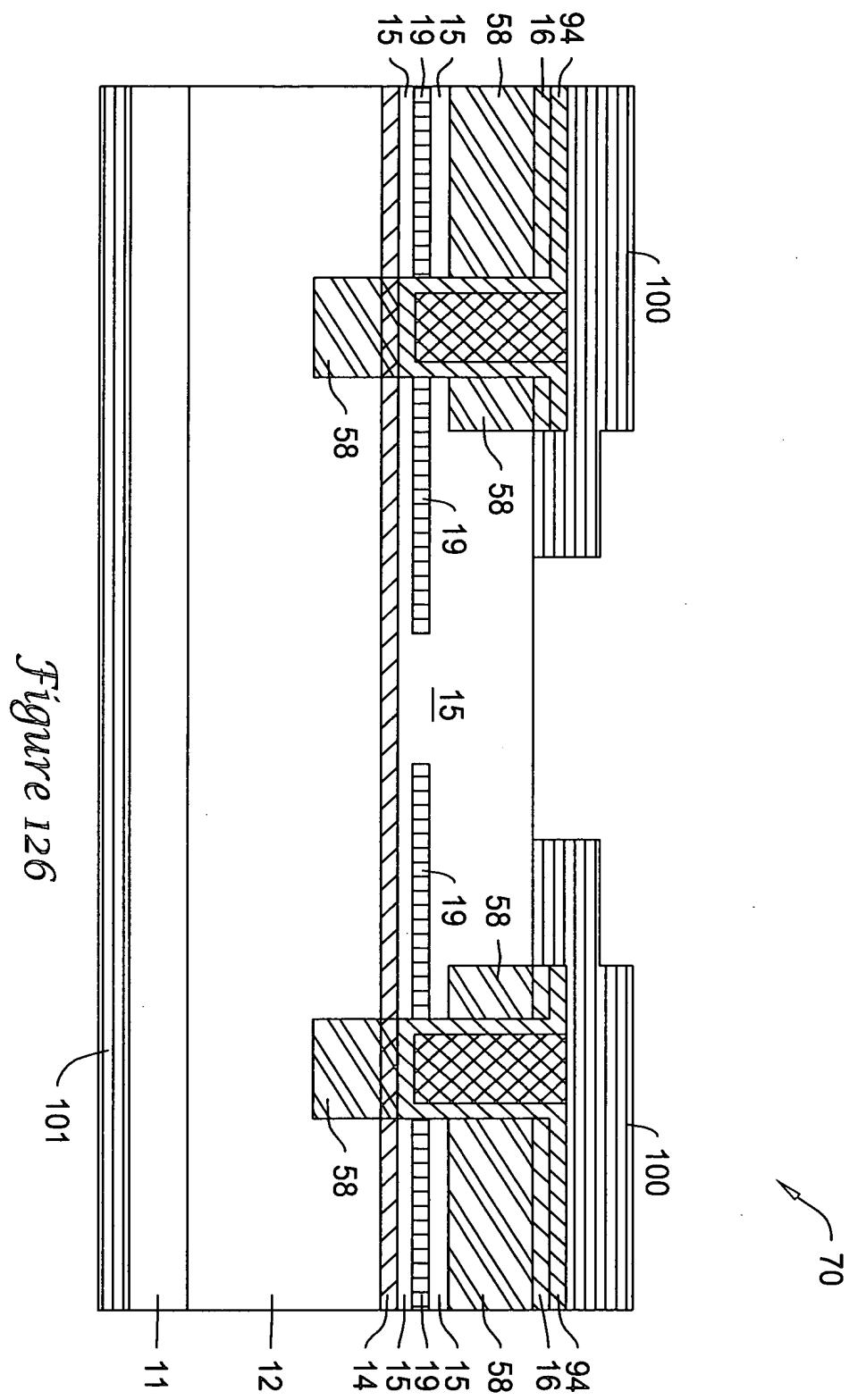
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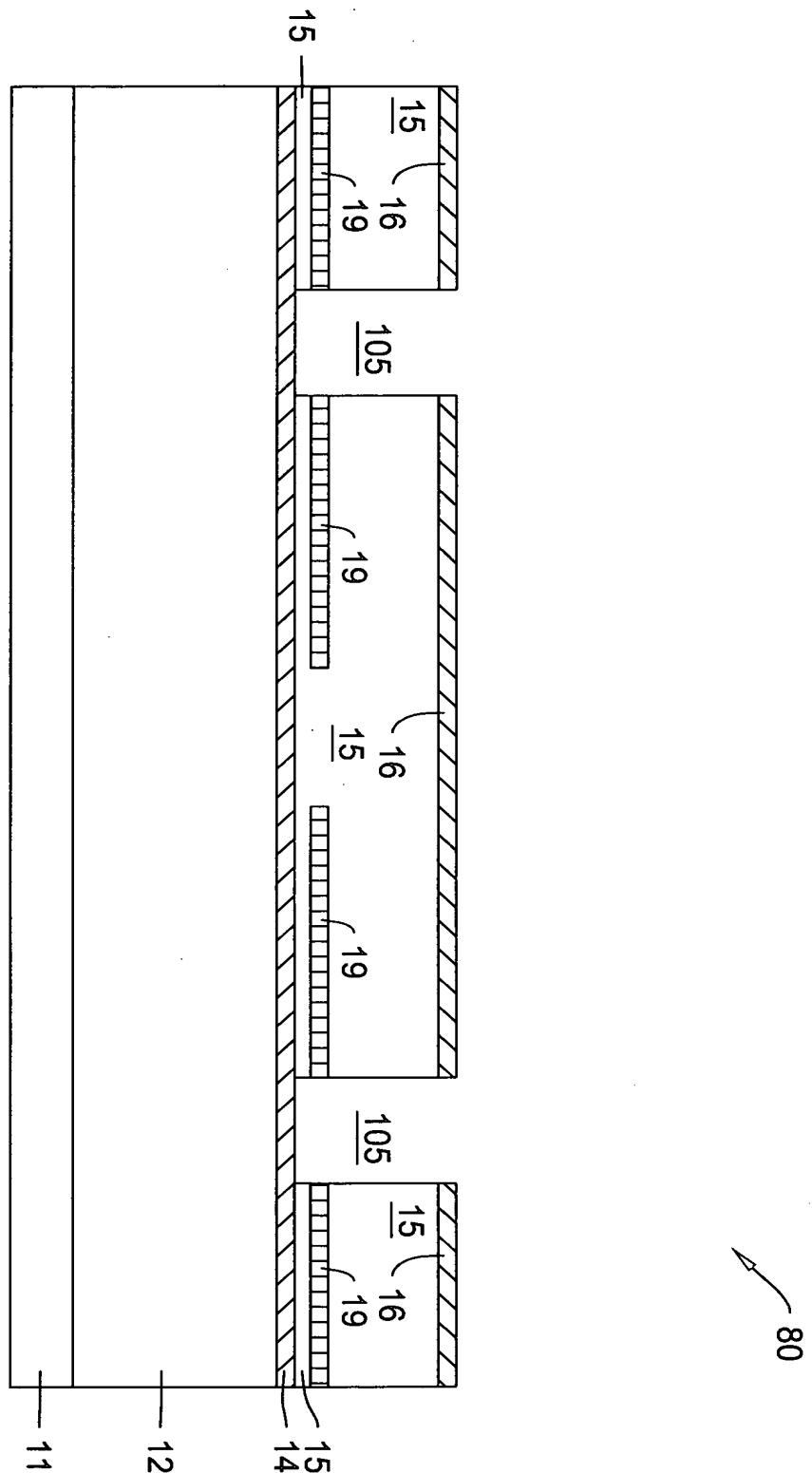
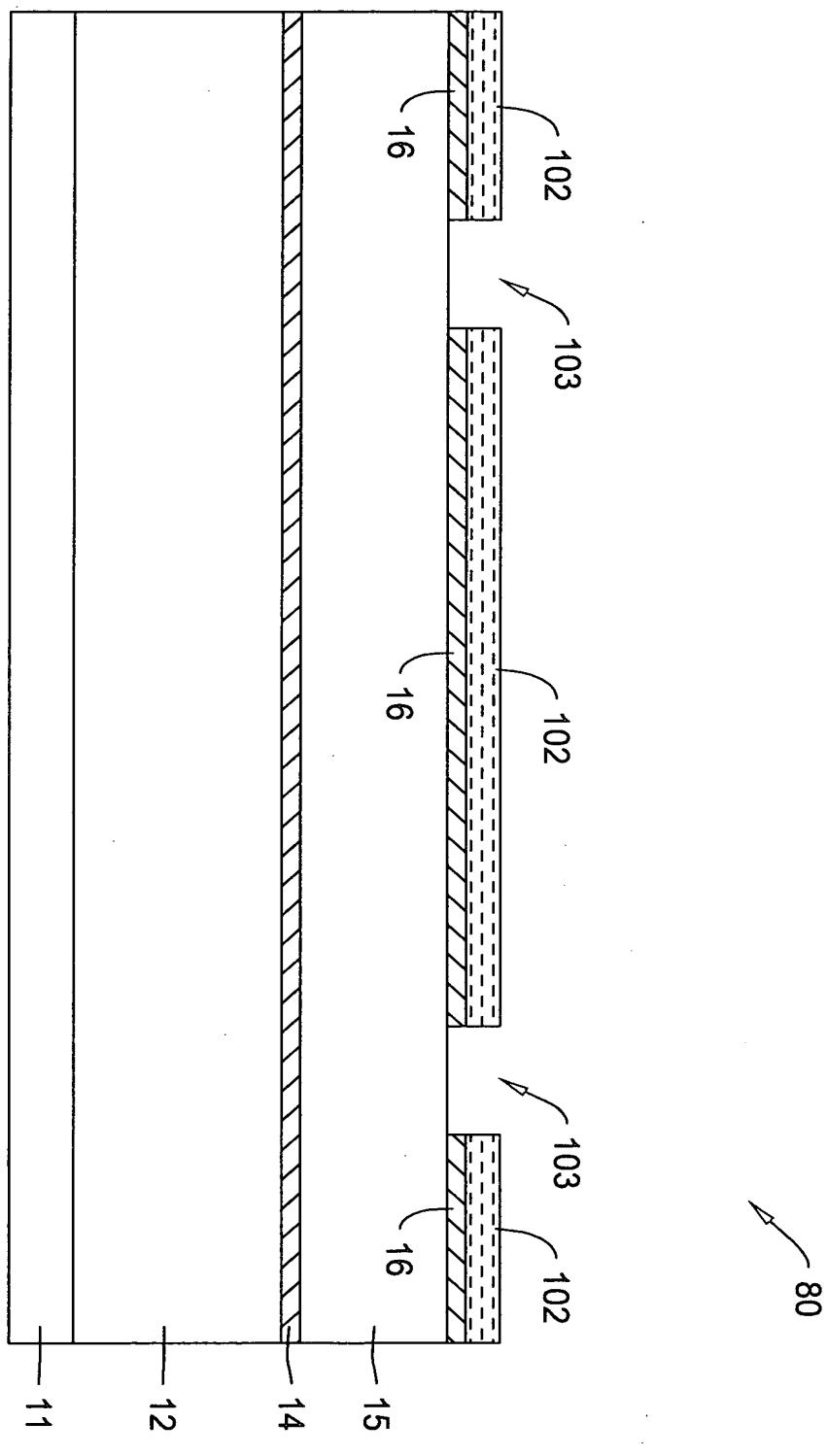
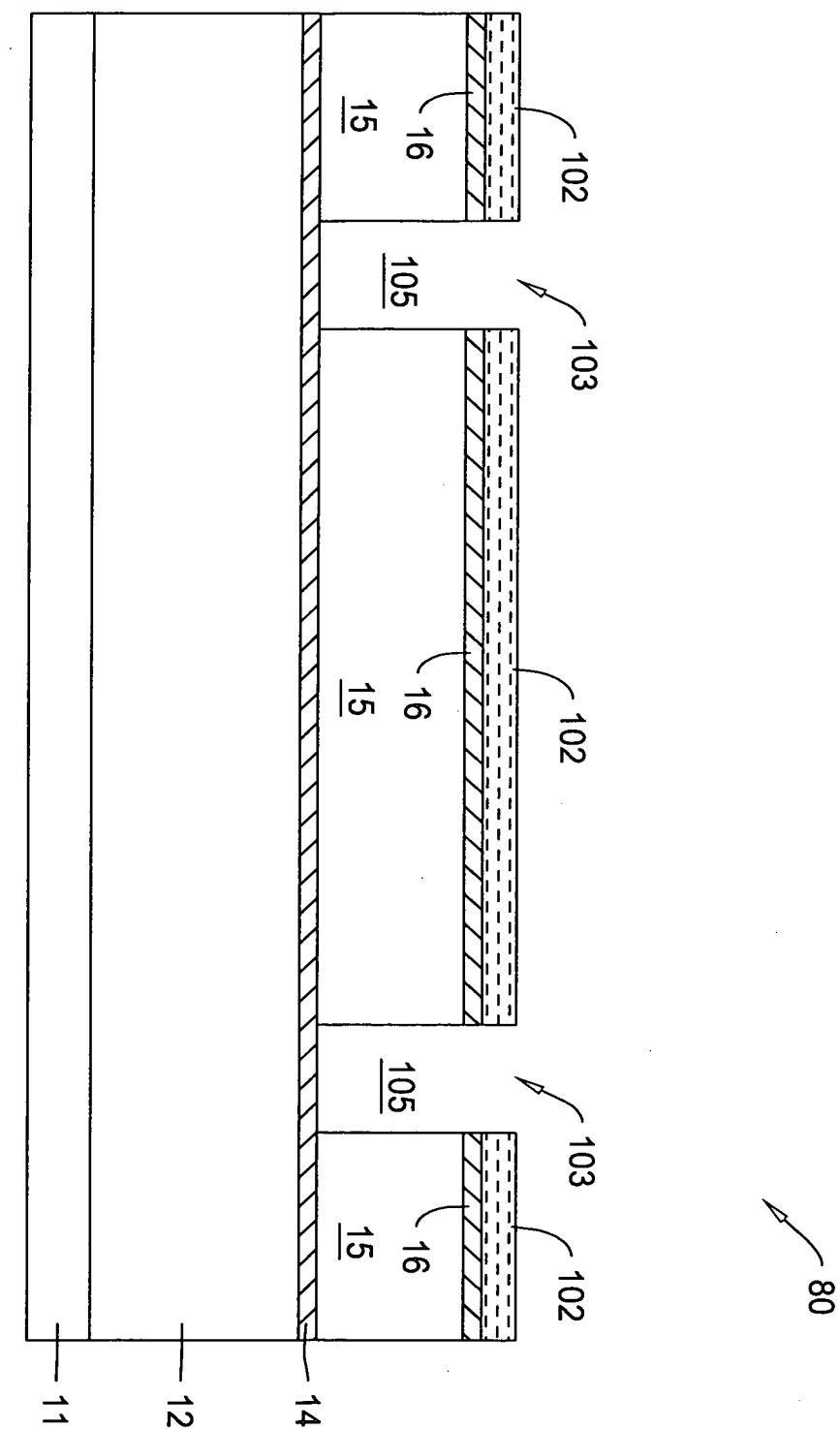


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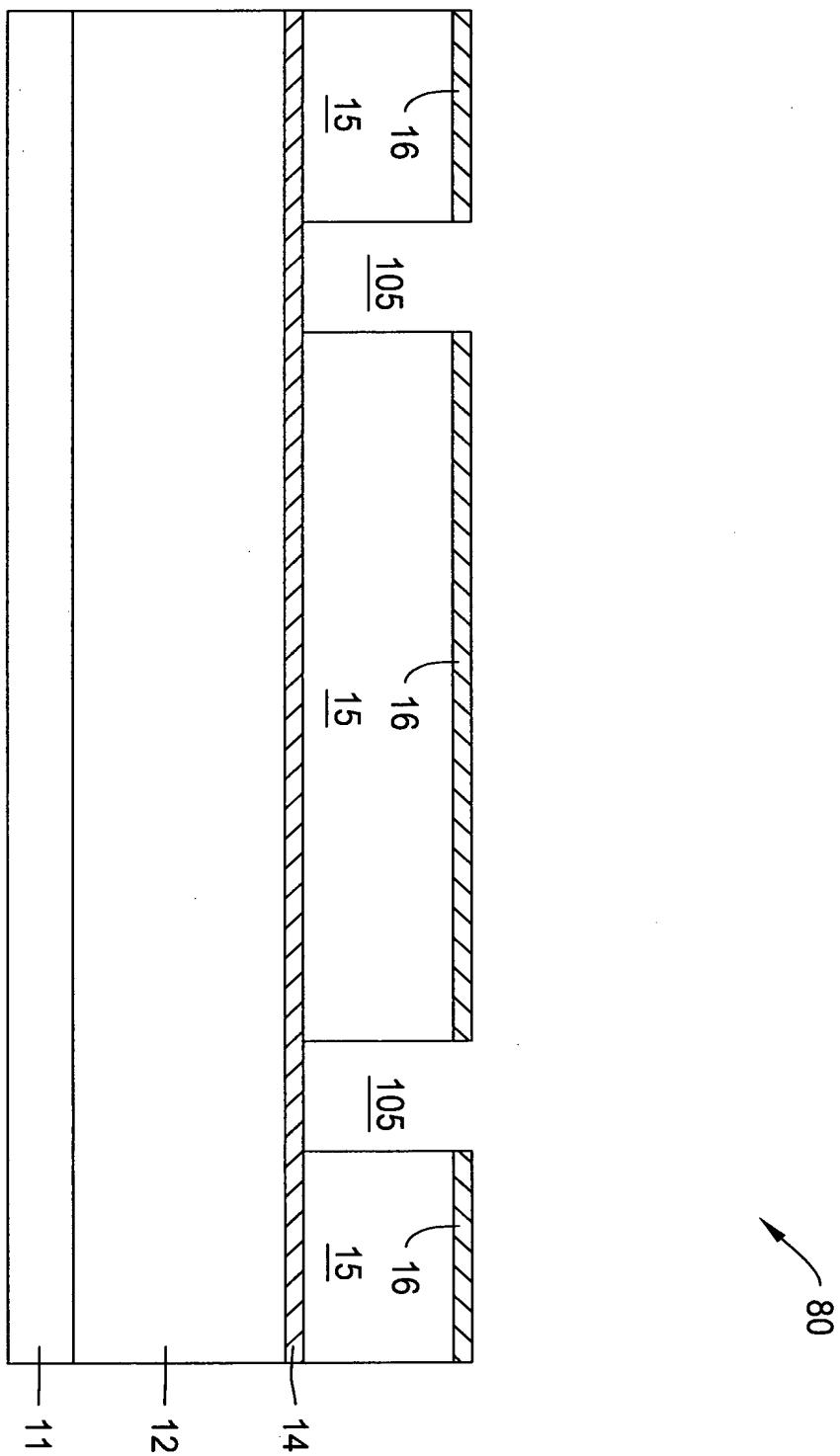
Figure 129





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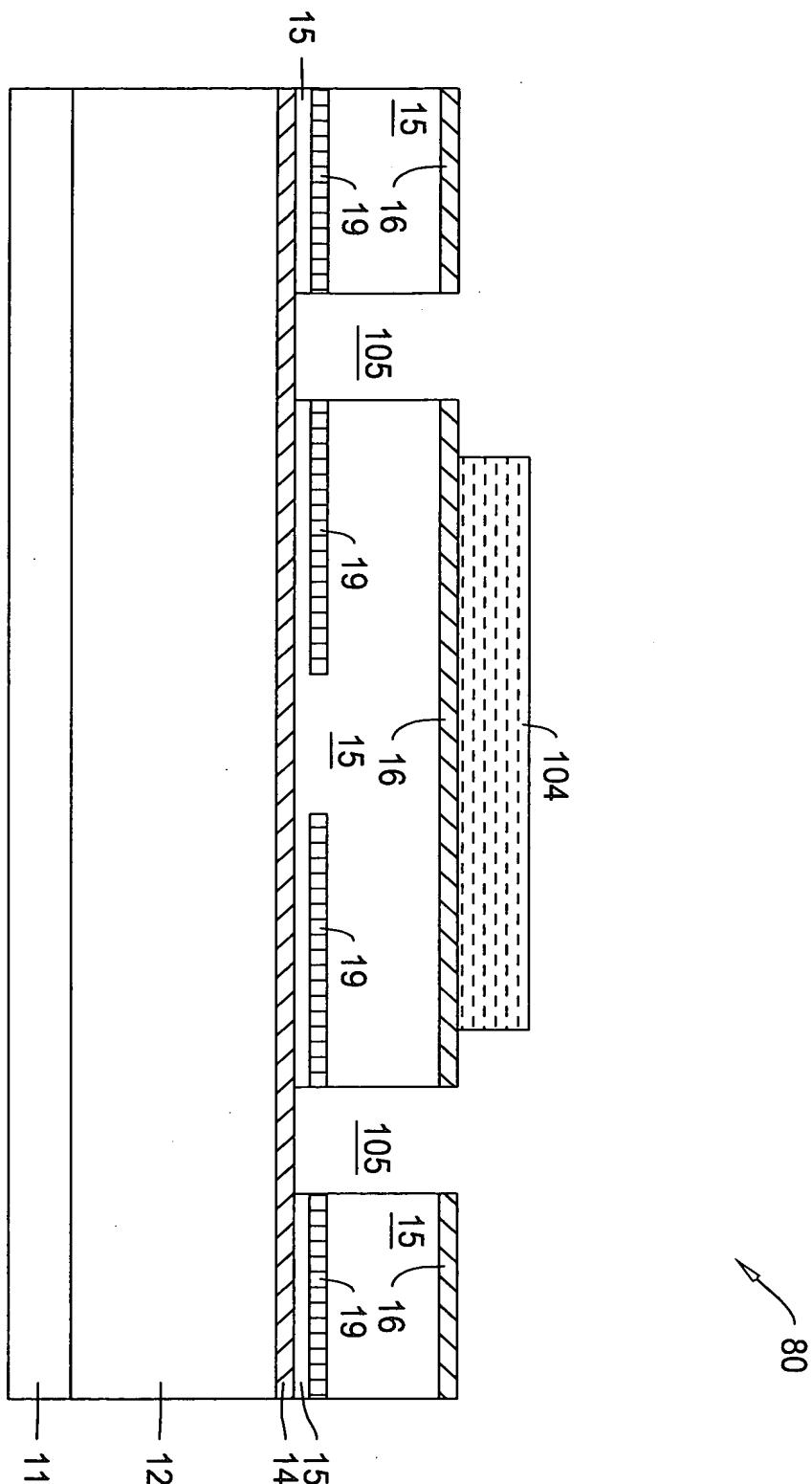
Figure 131



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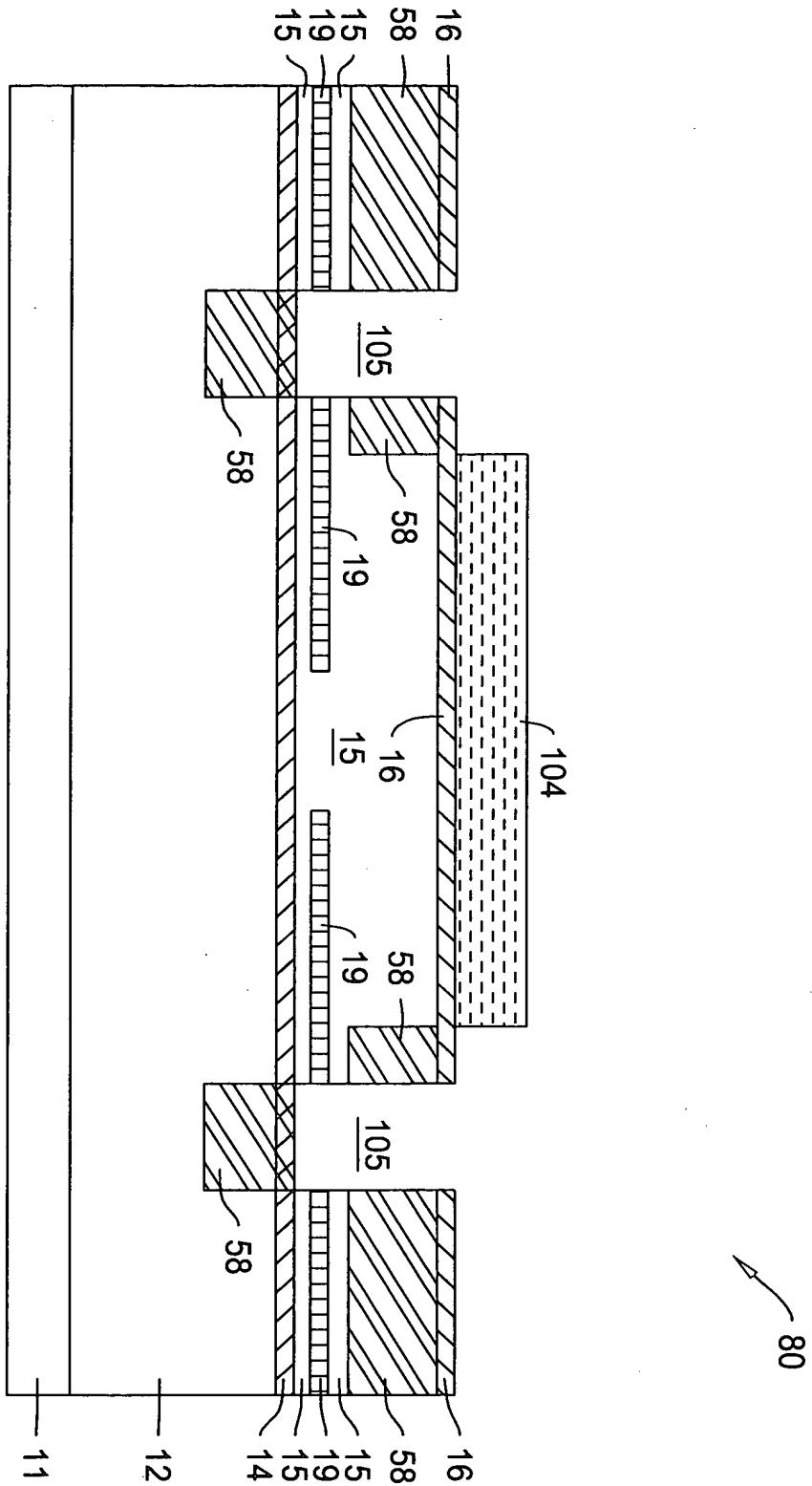
Figure 133



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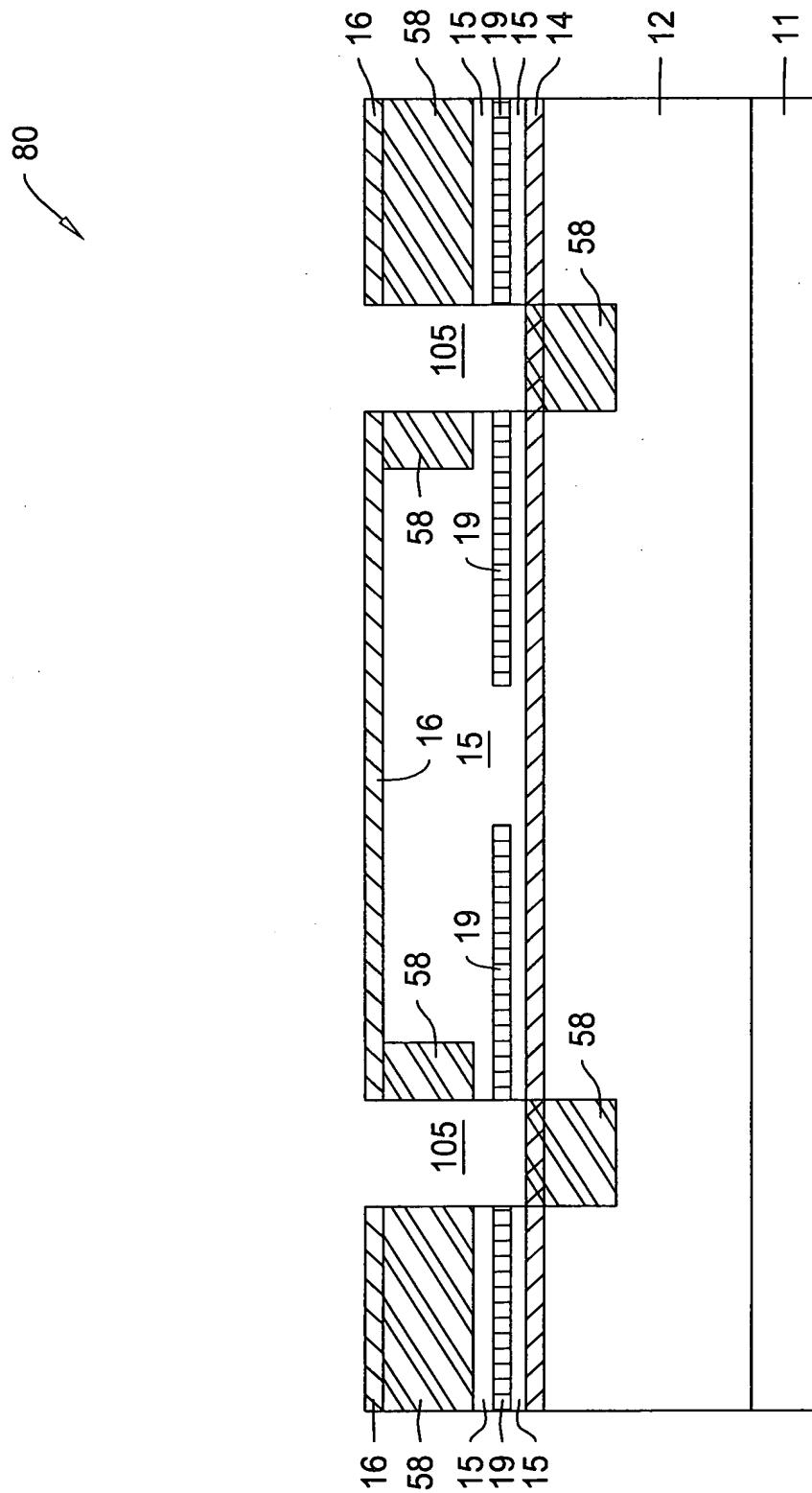


Figure 135

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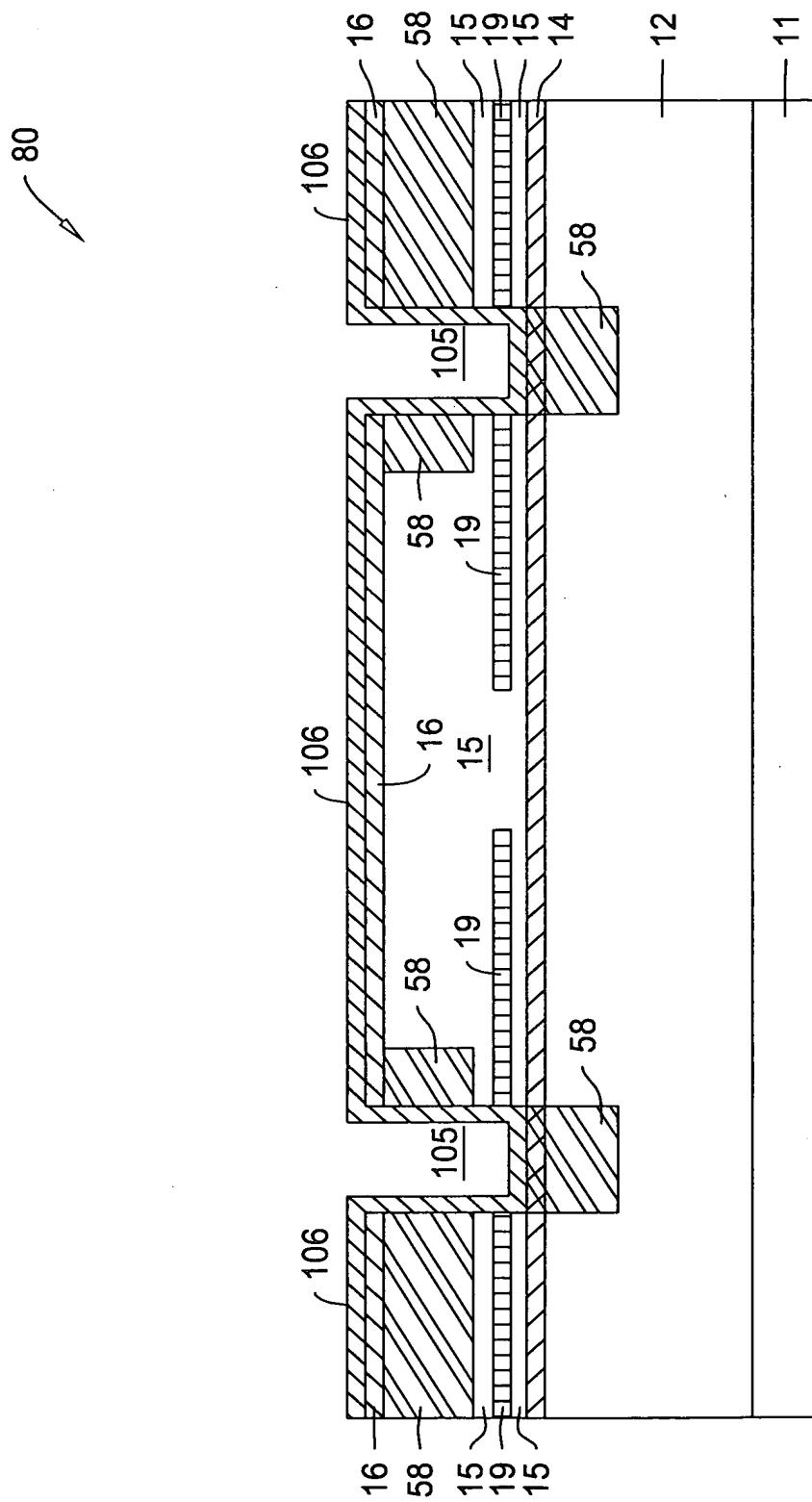


Figure 136

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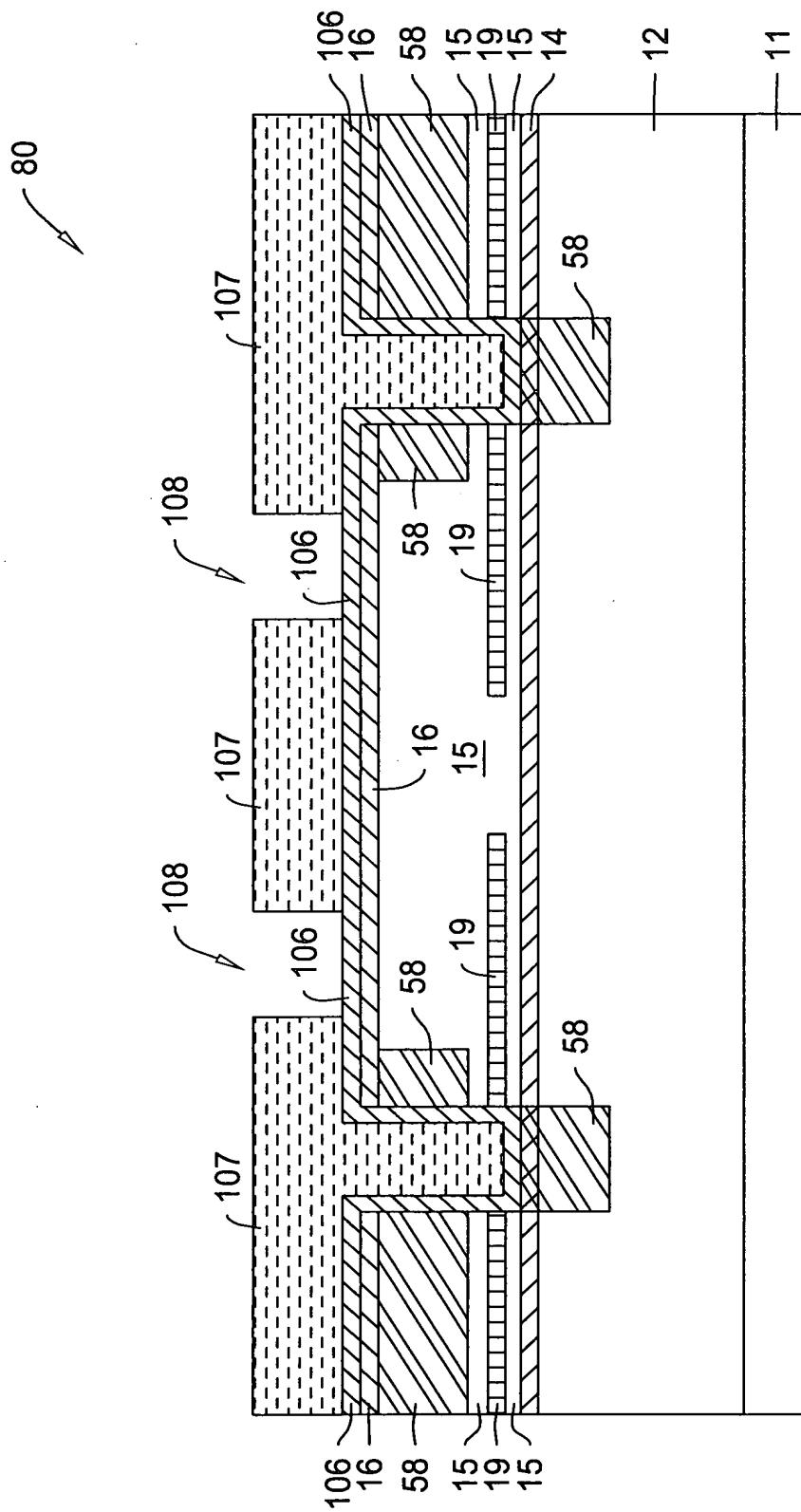


Figure 137

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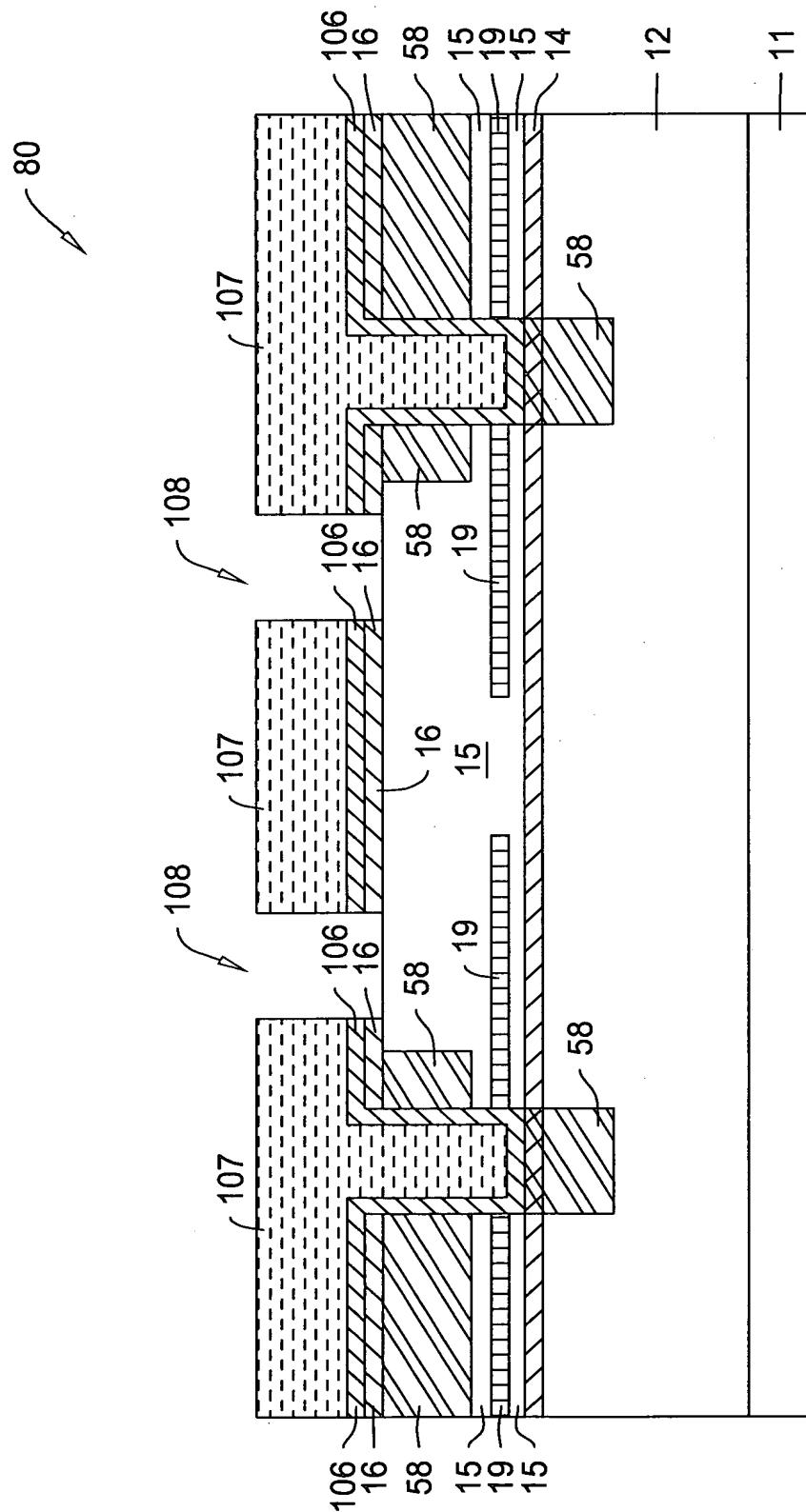


Figure 138

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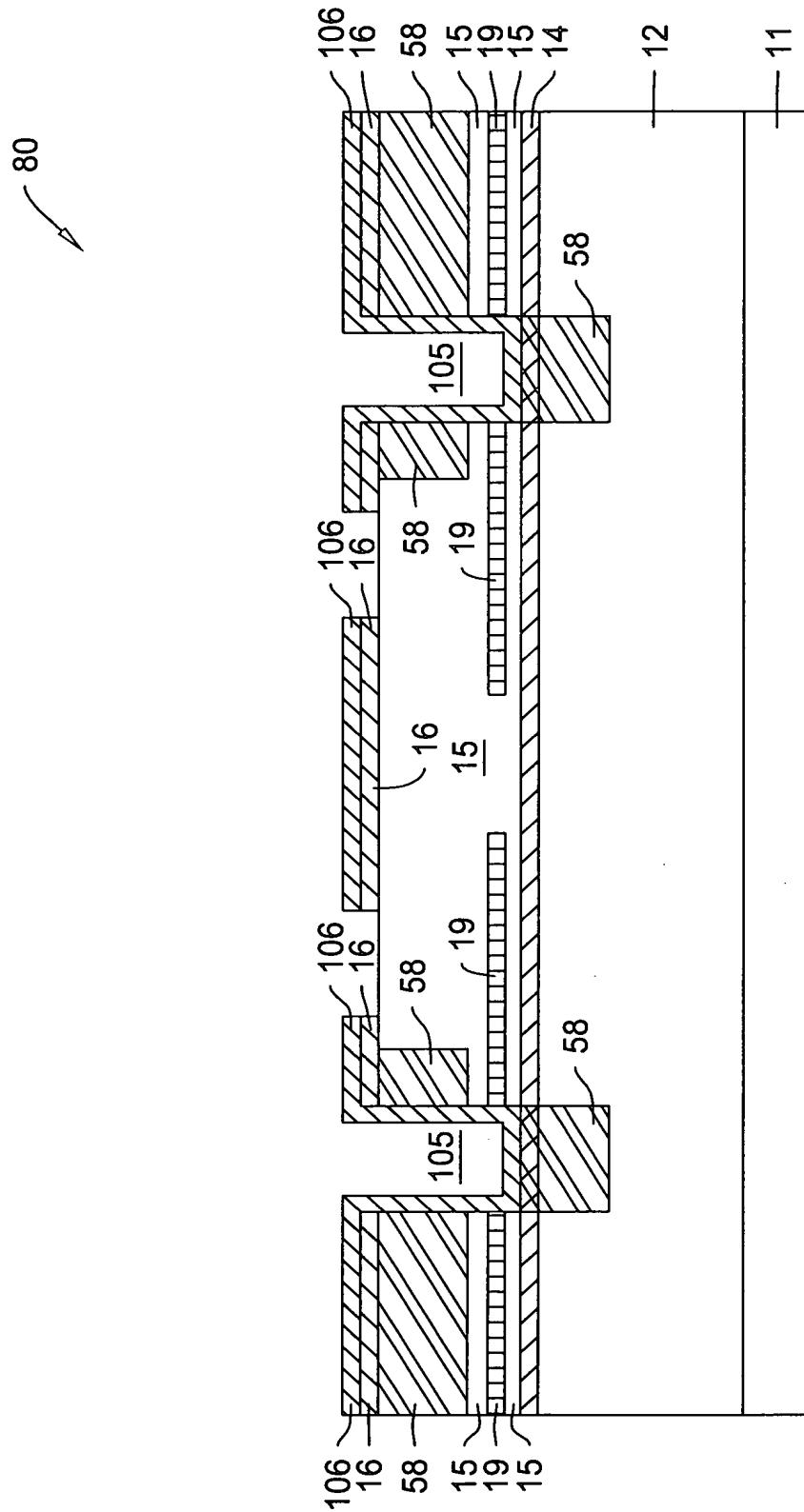


Figure 139

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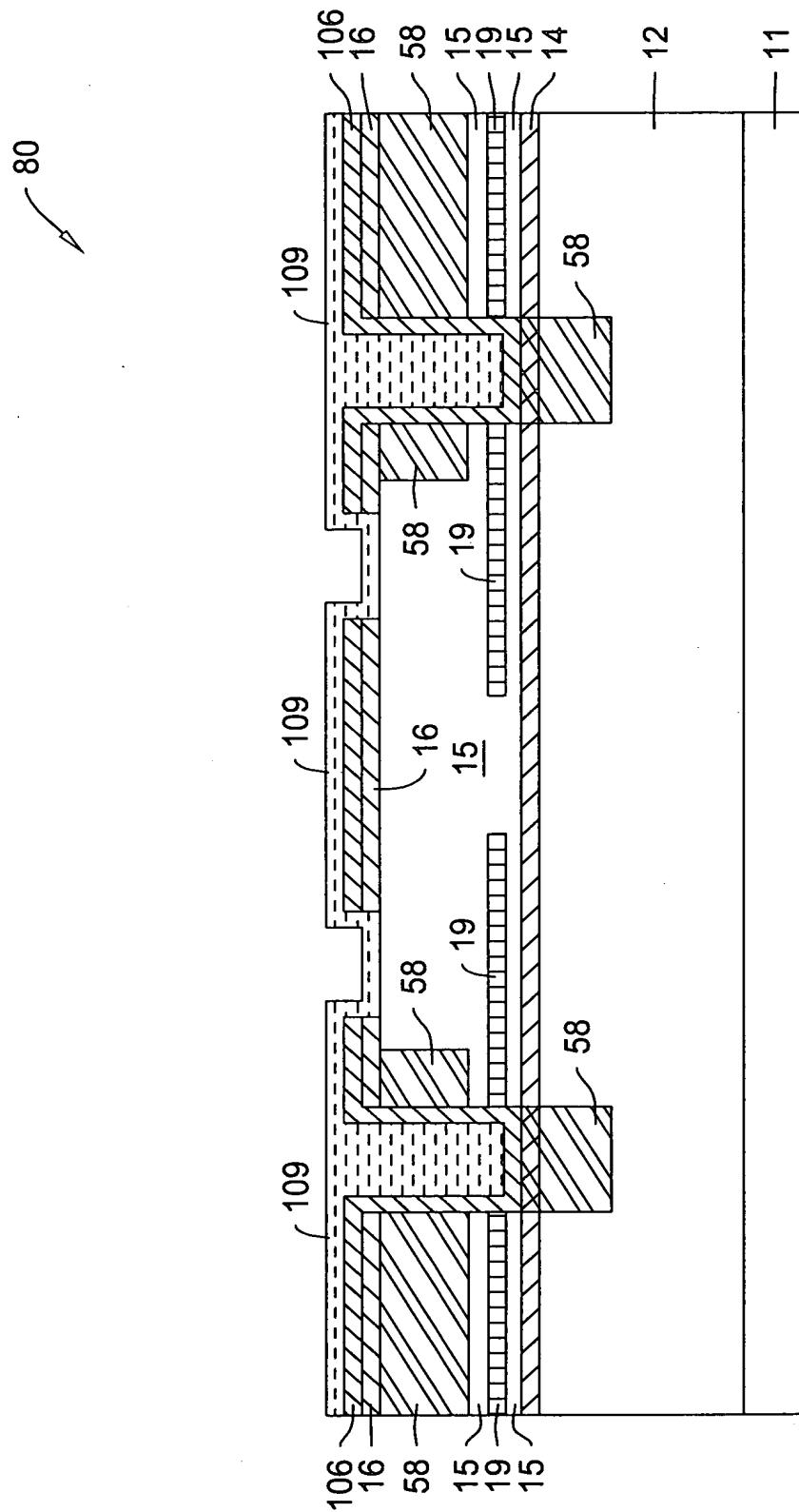


Figure 140

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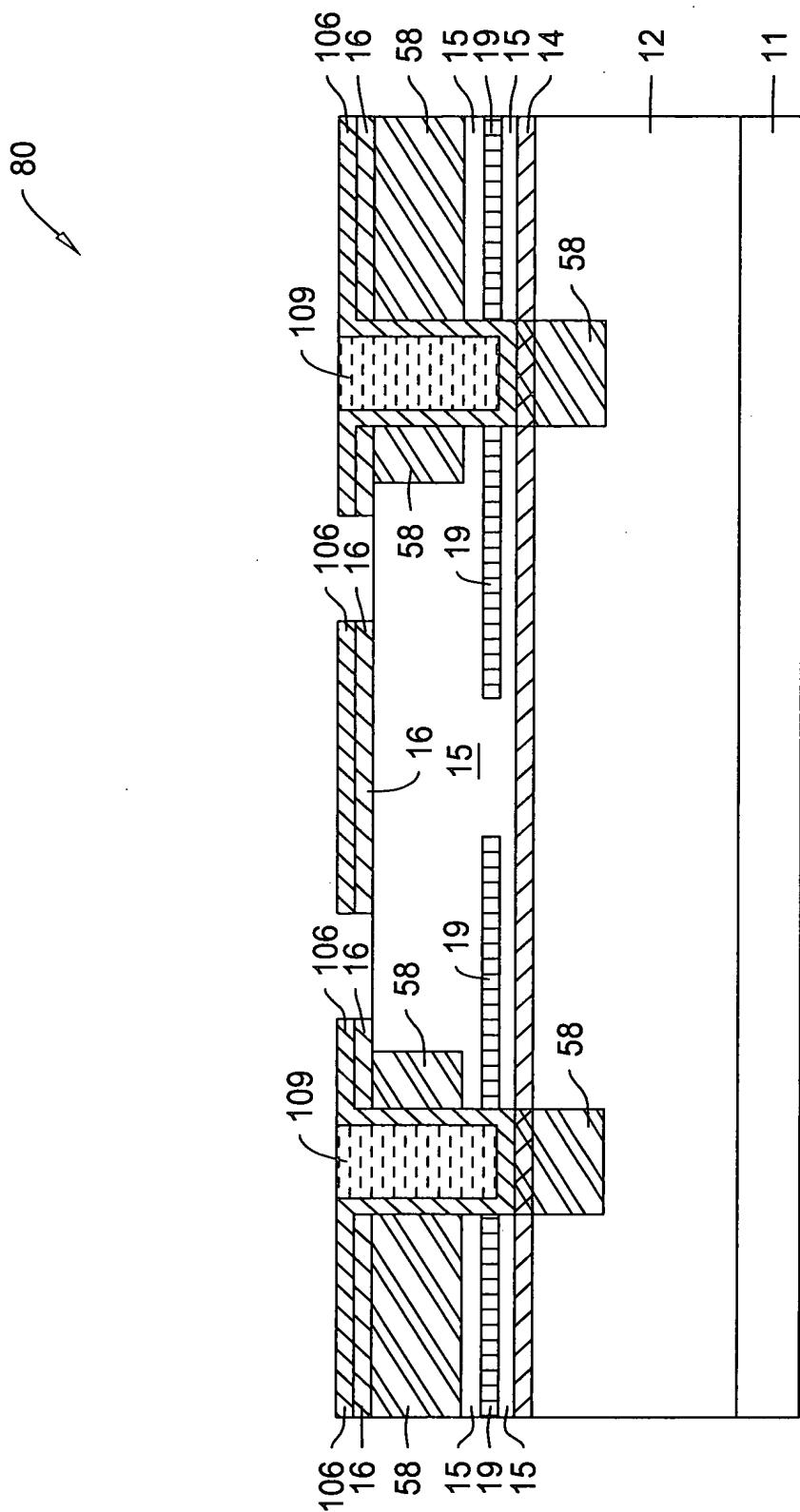


Figure 141

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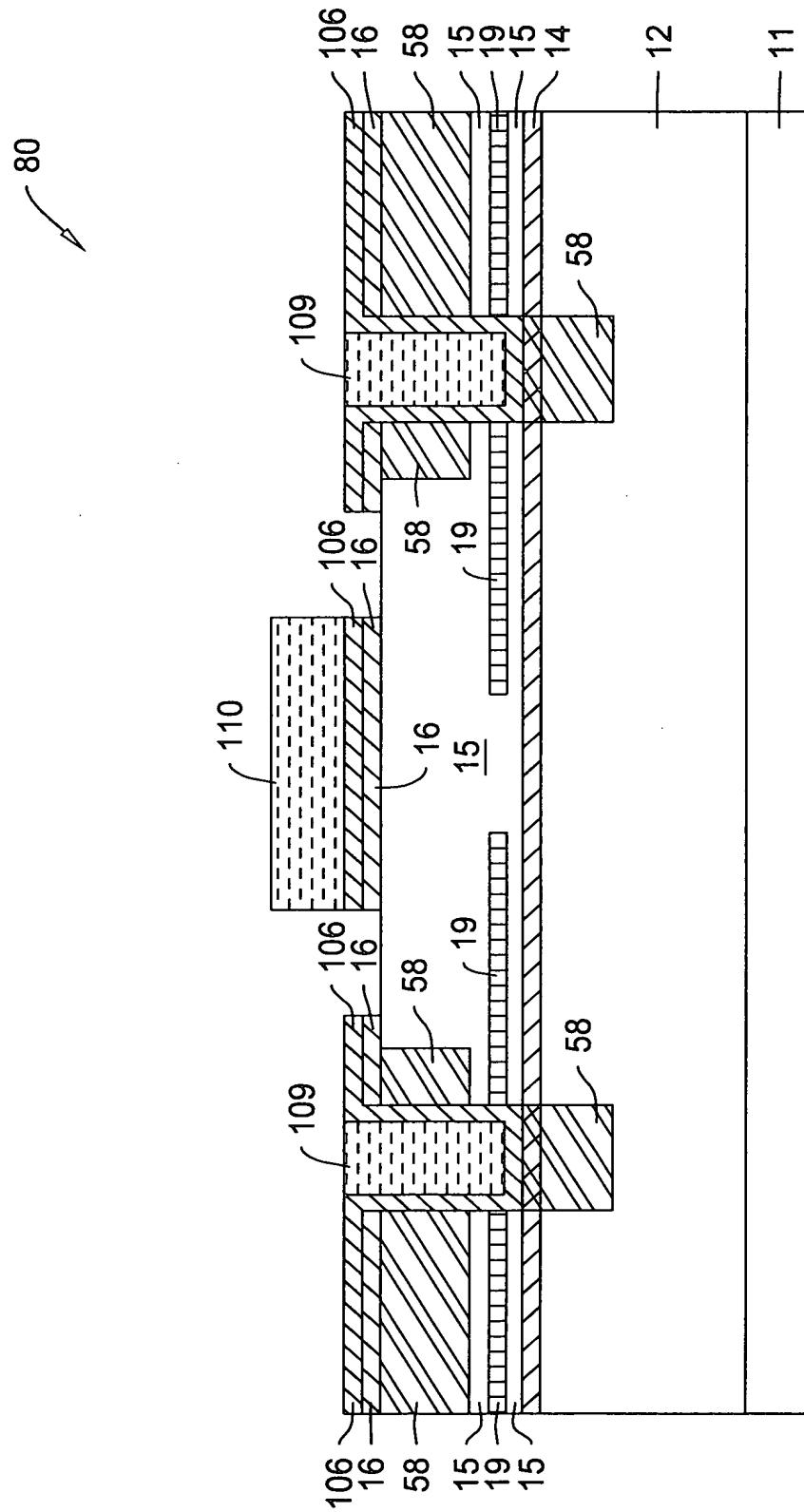


Figure 142

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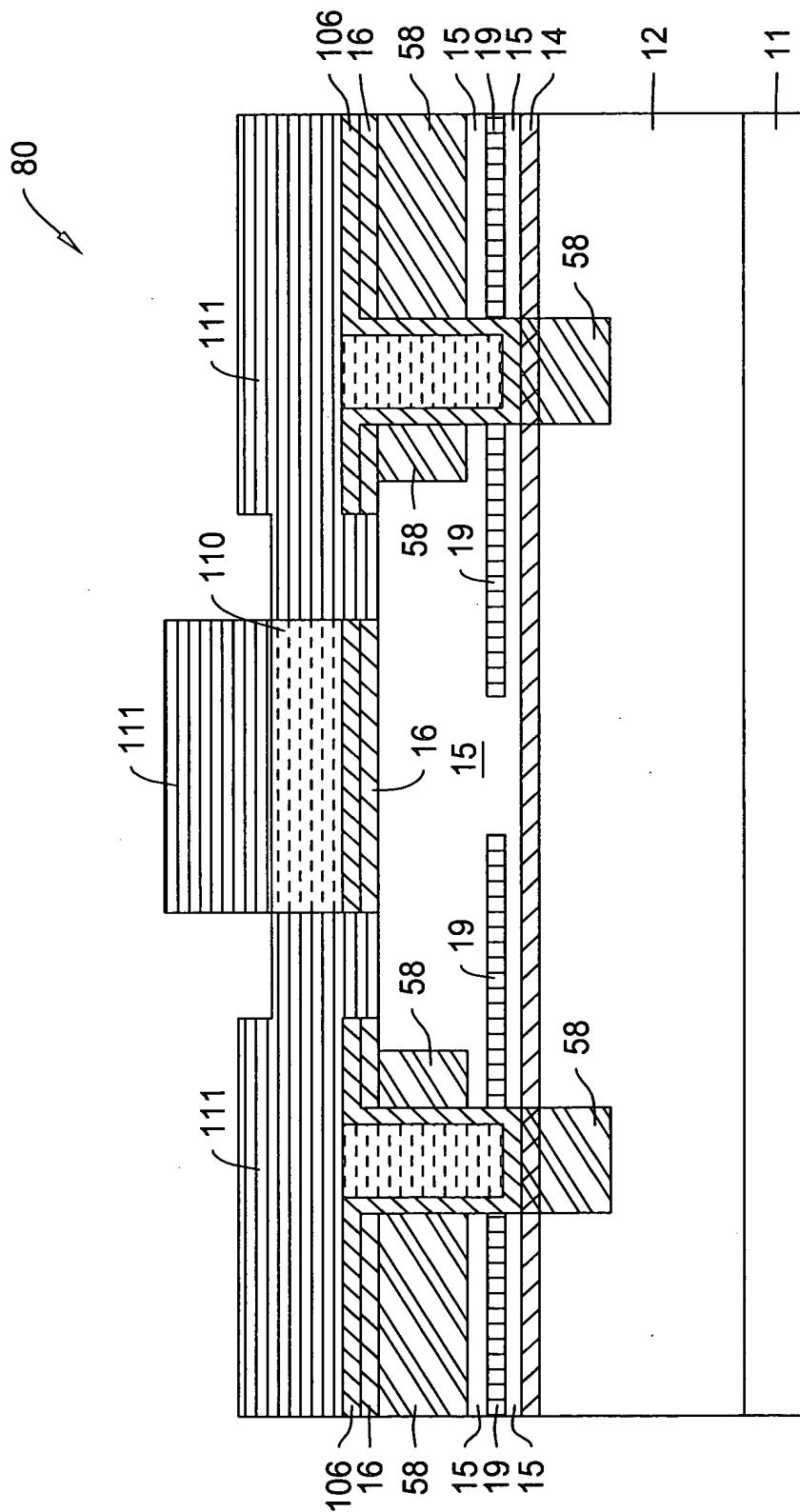


Figure 143

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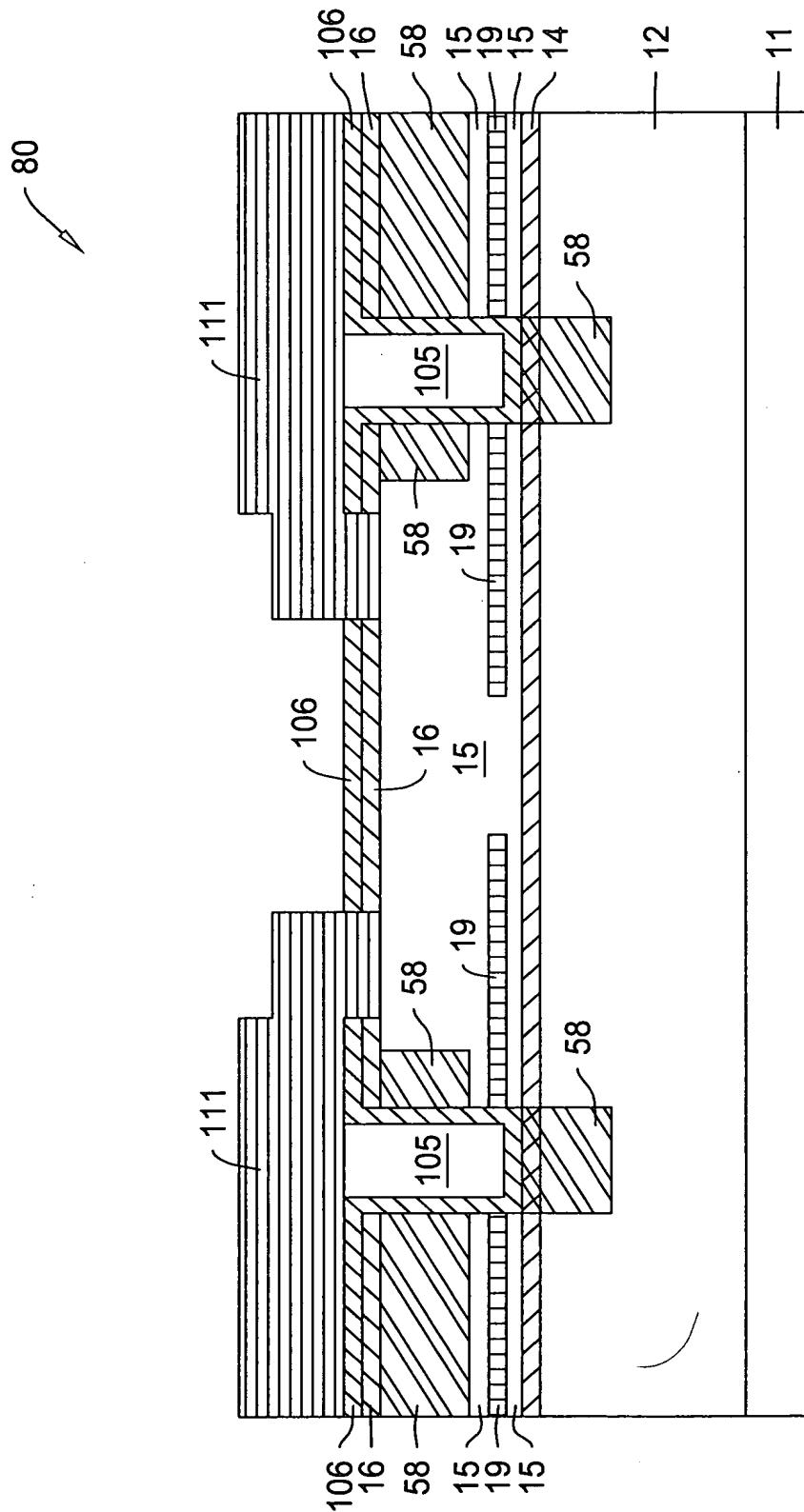


Figure 144

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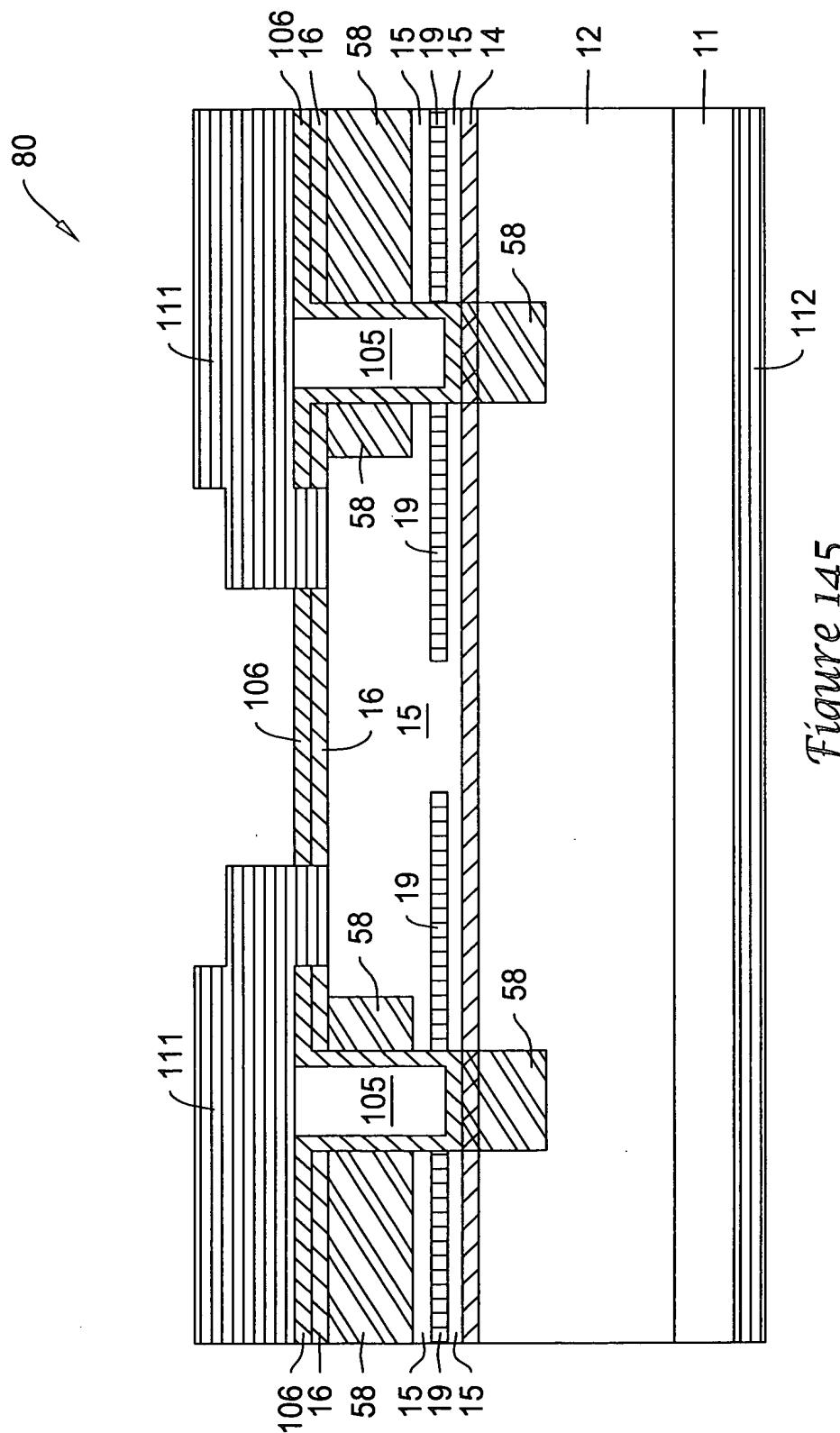


Figure 145

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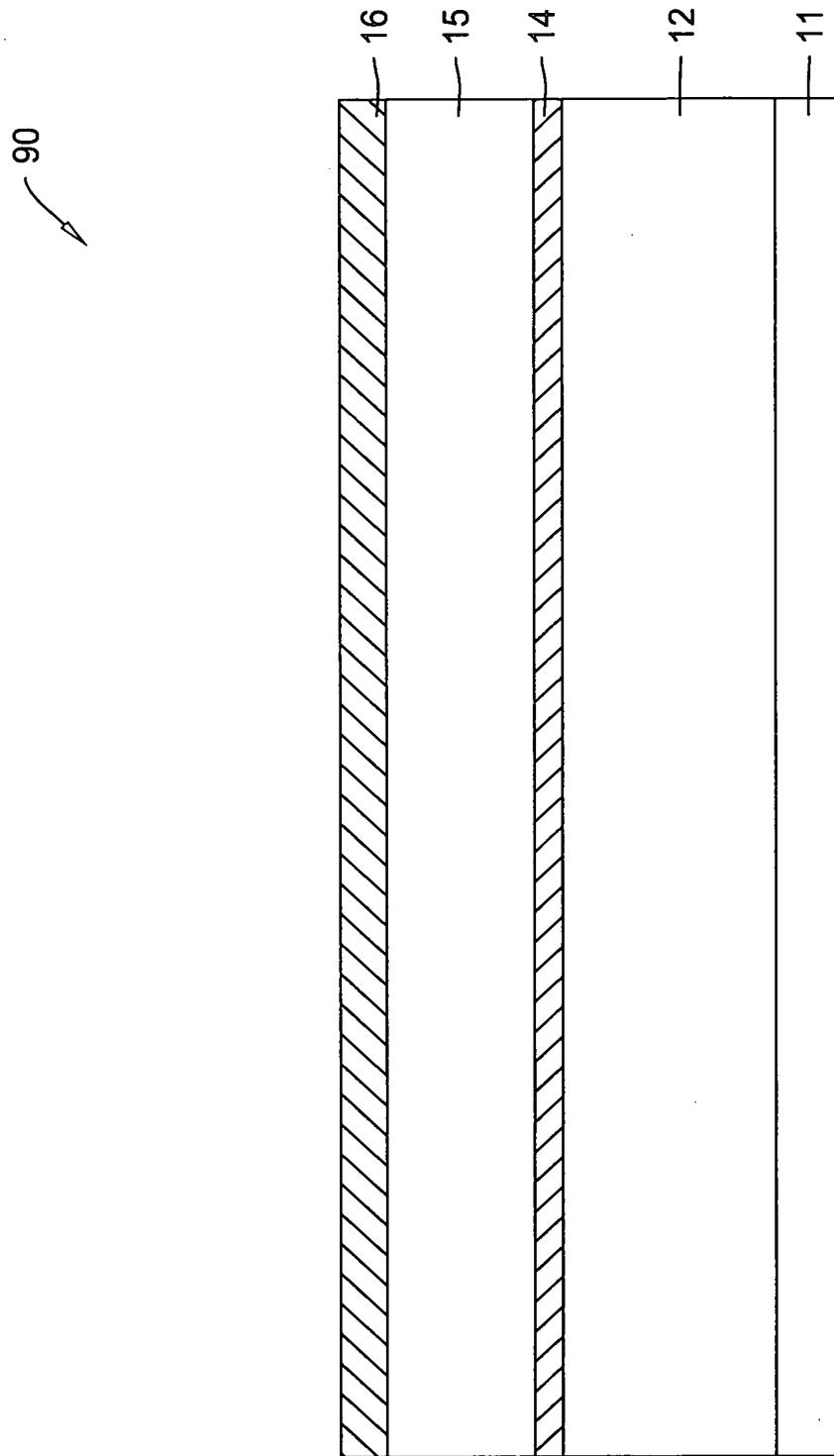


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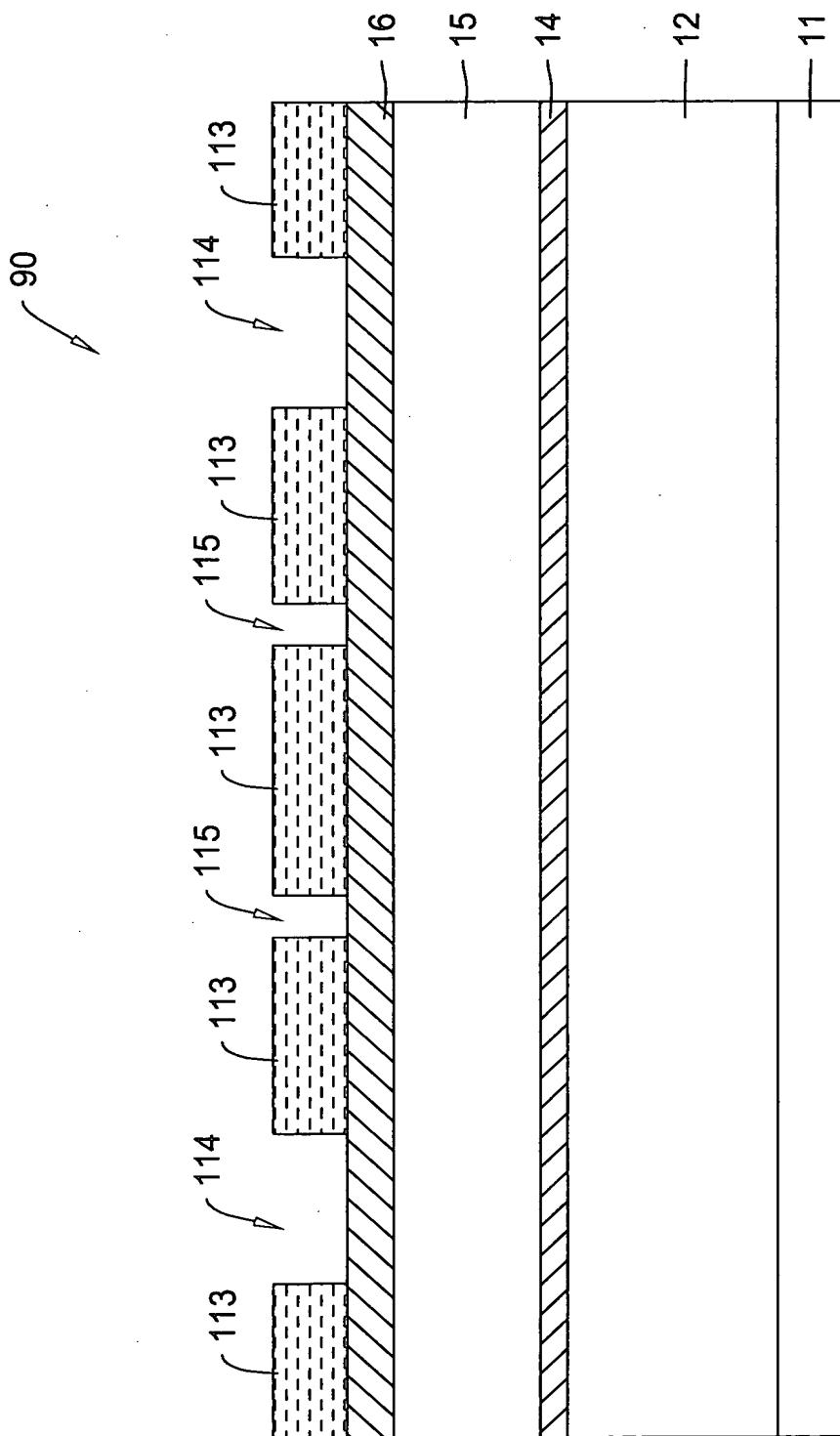


Figure 147

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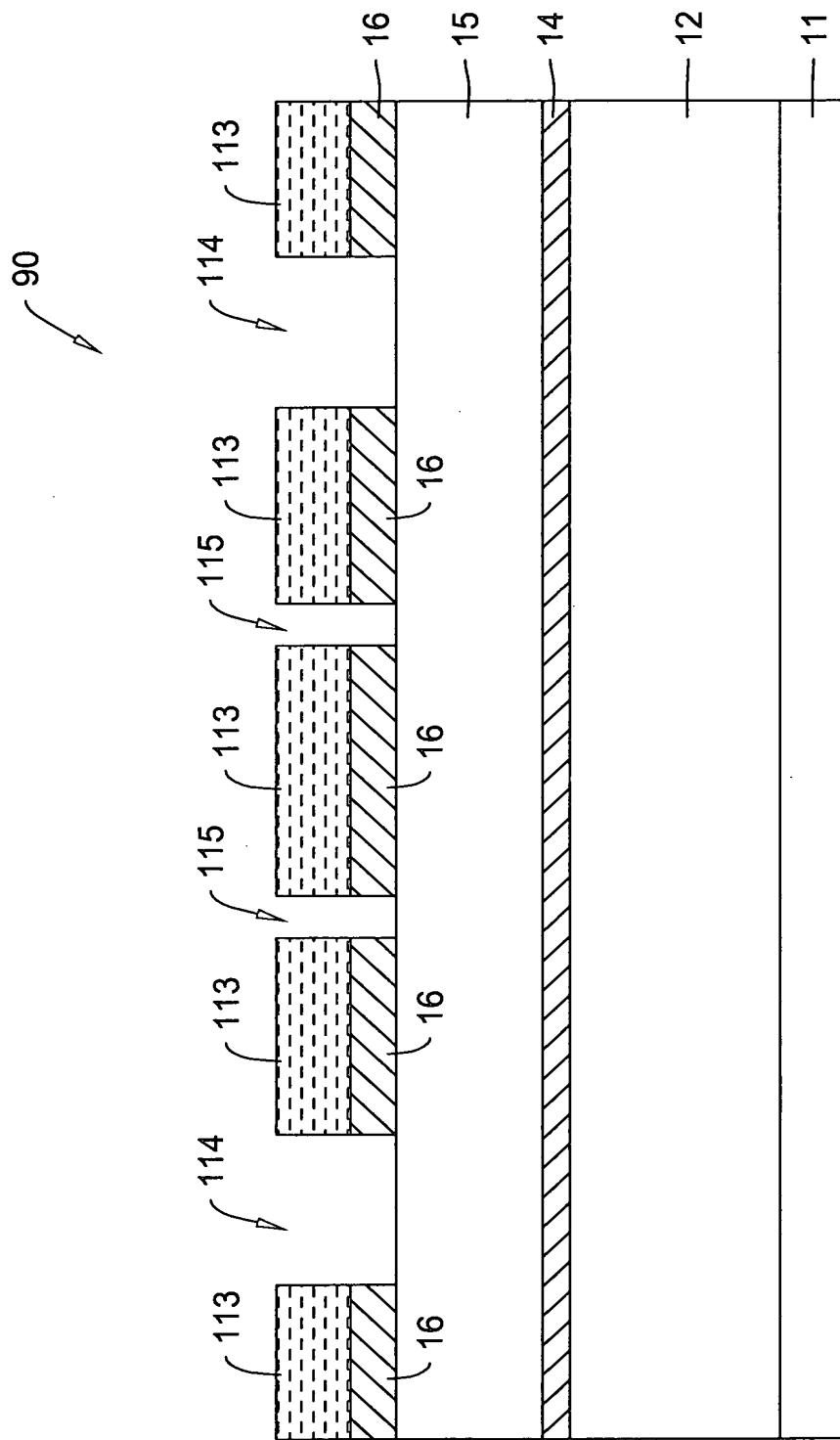


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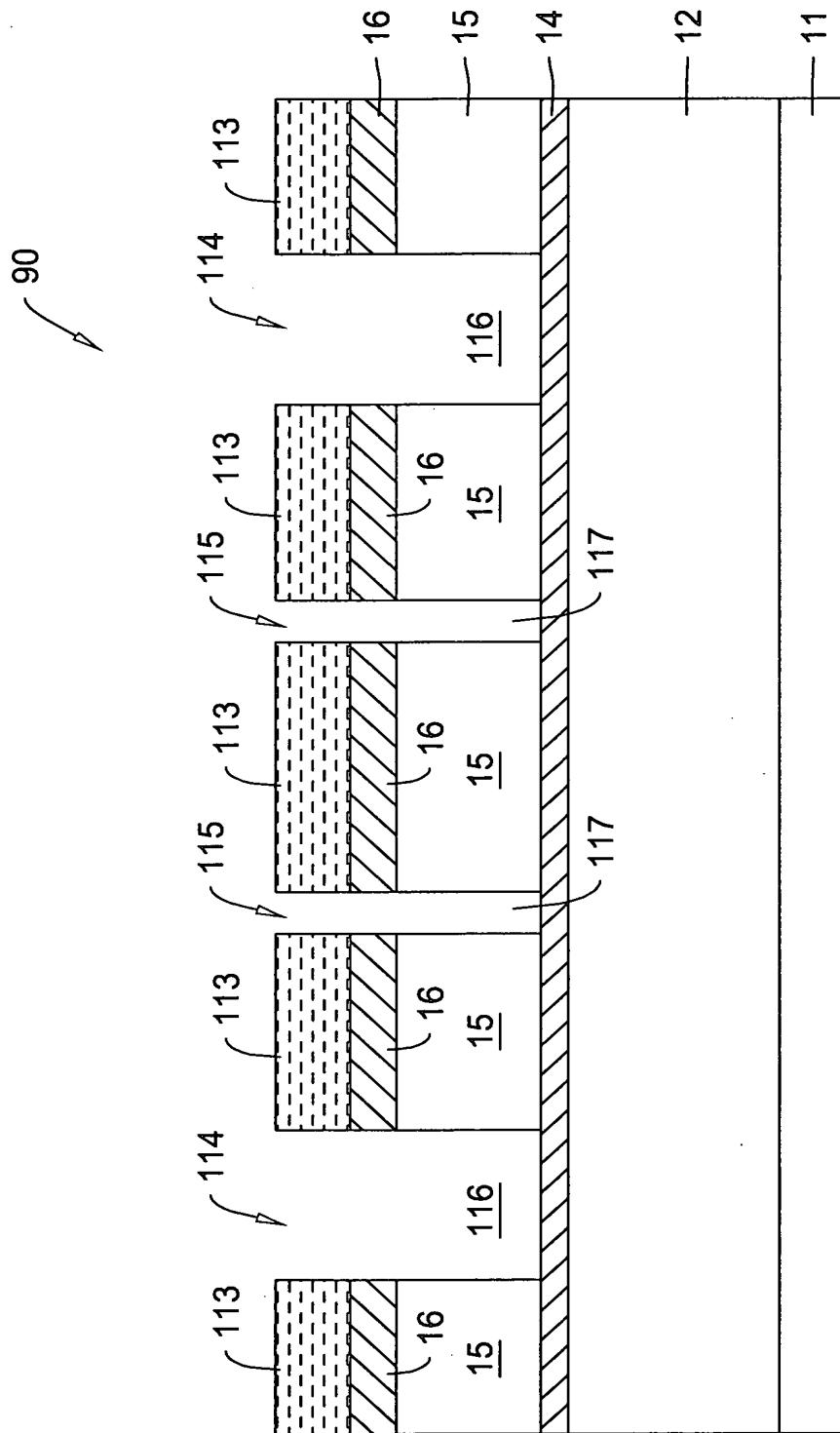


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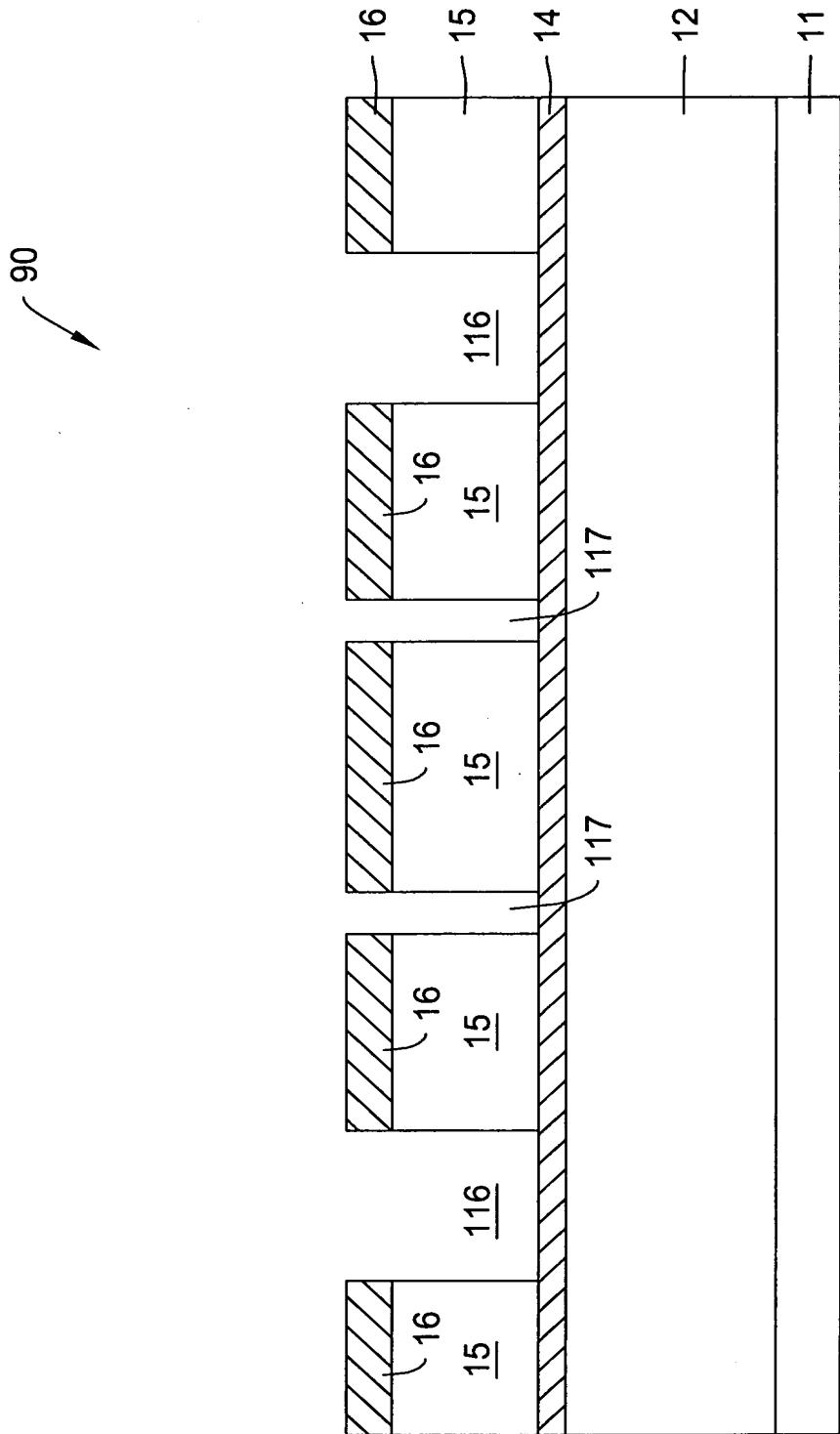


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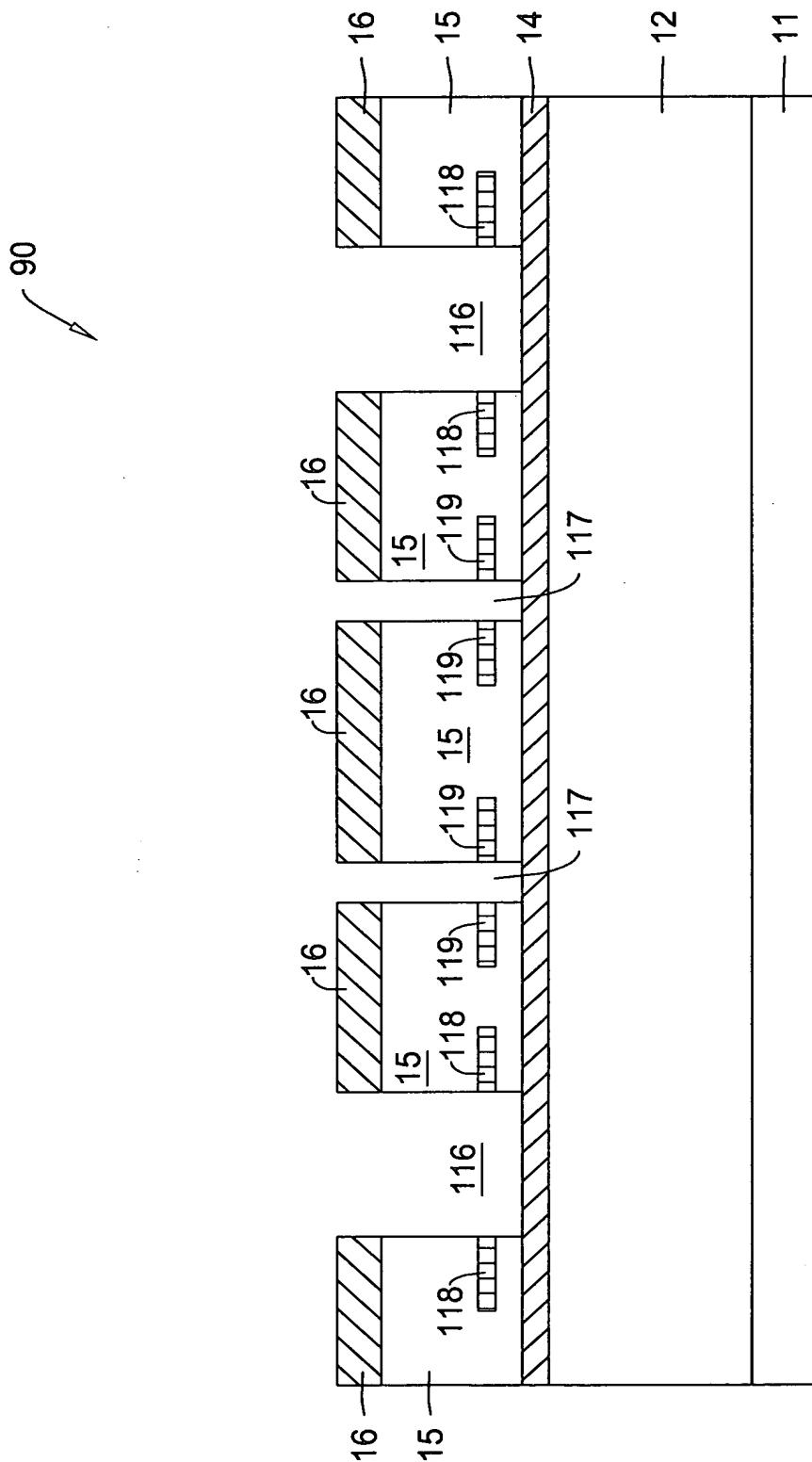


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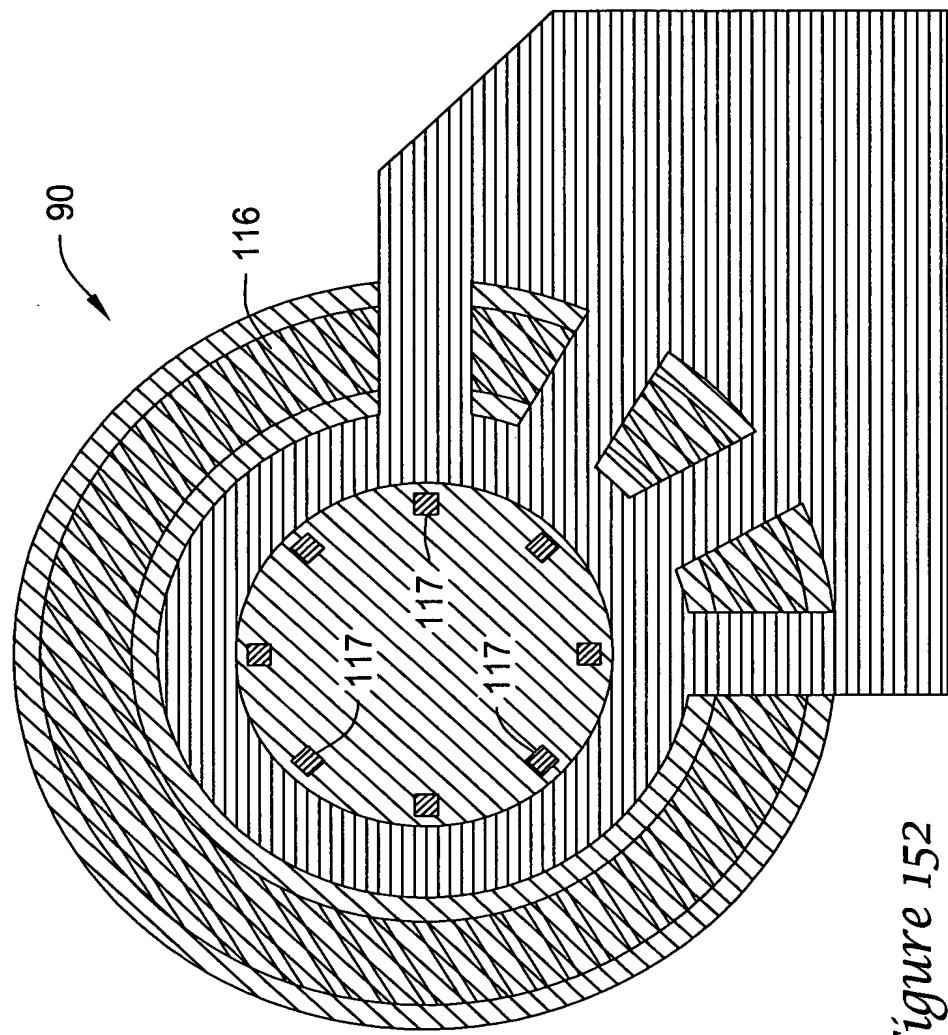


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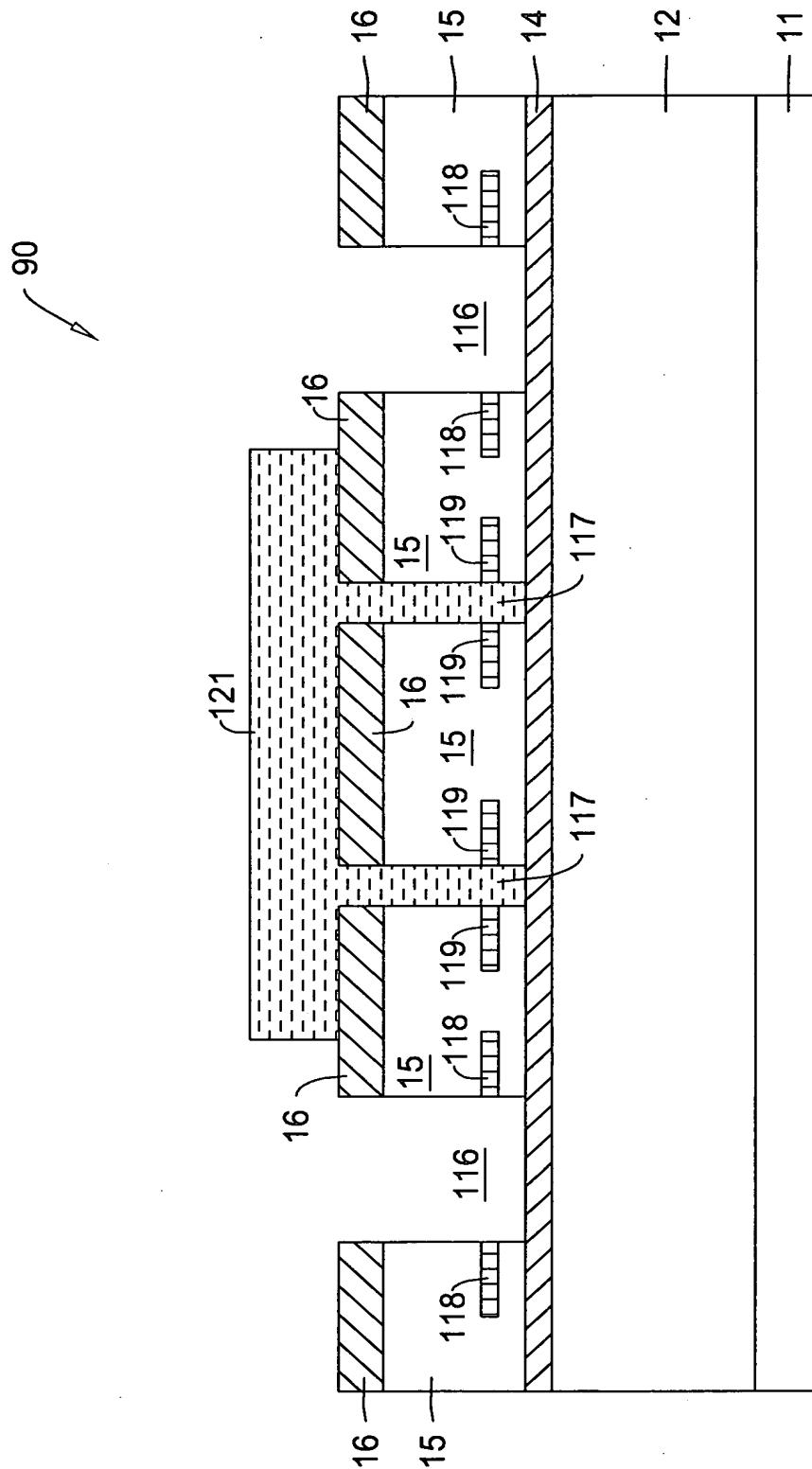


Figure 153

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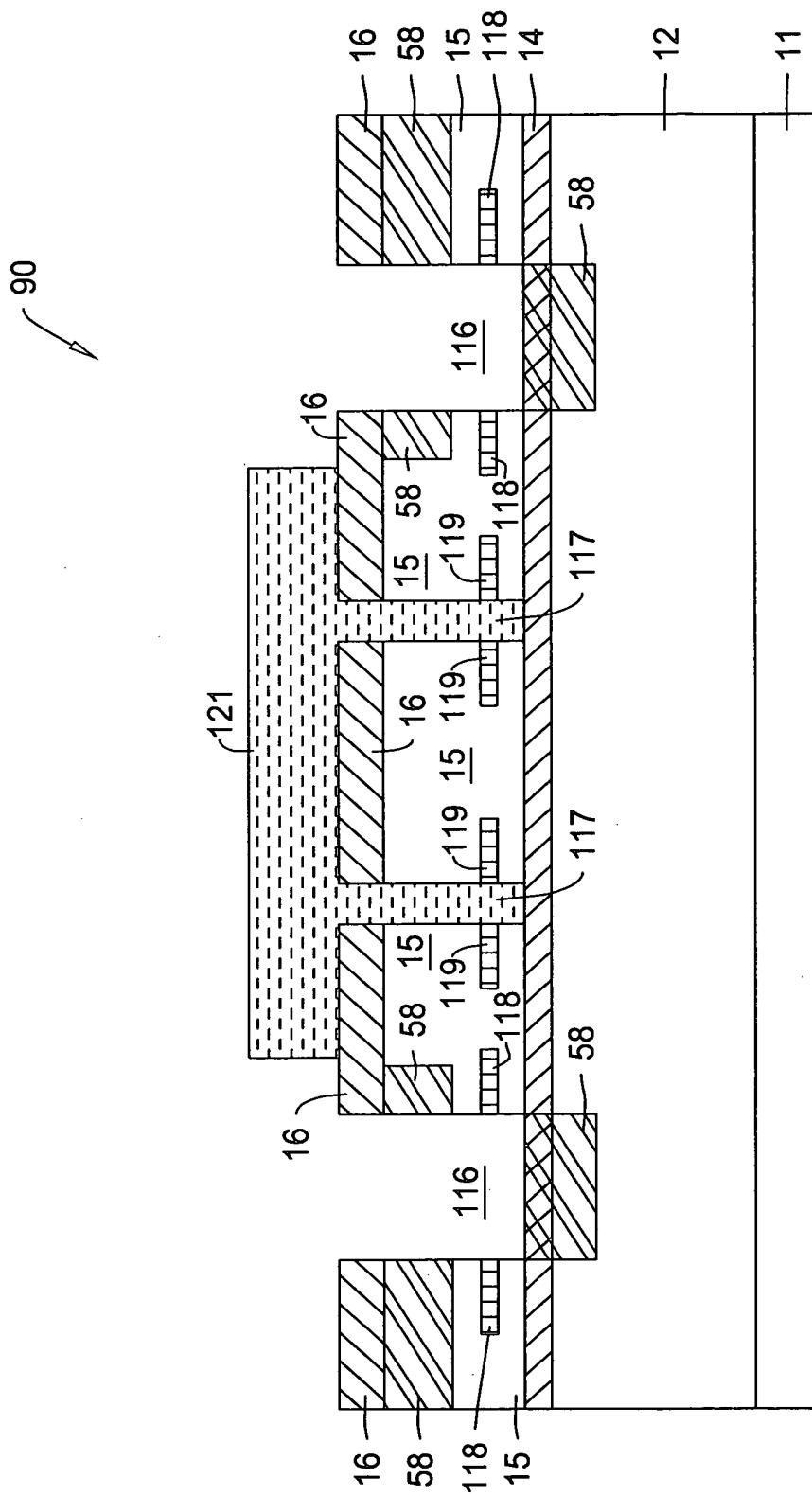


Figure 154

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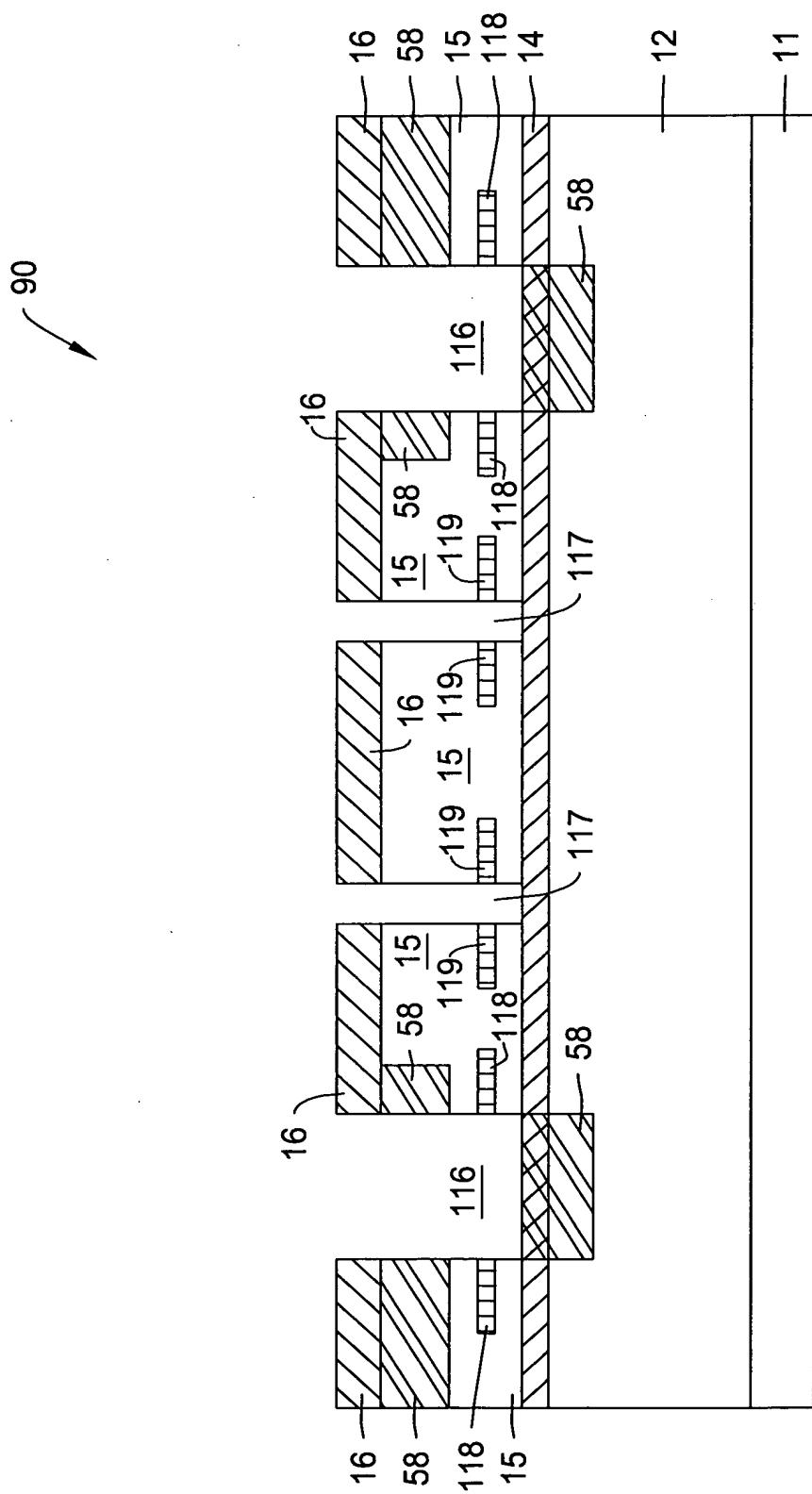


Figure 155

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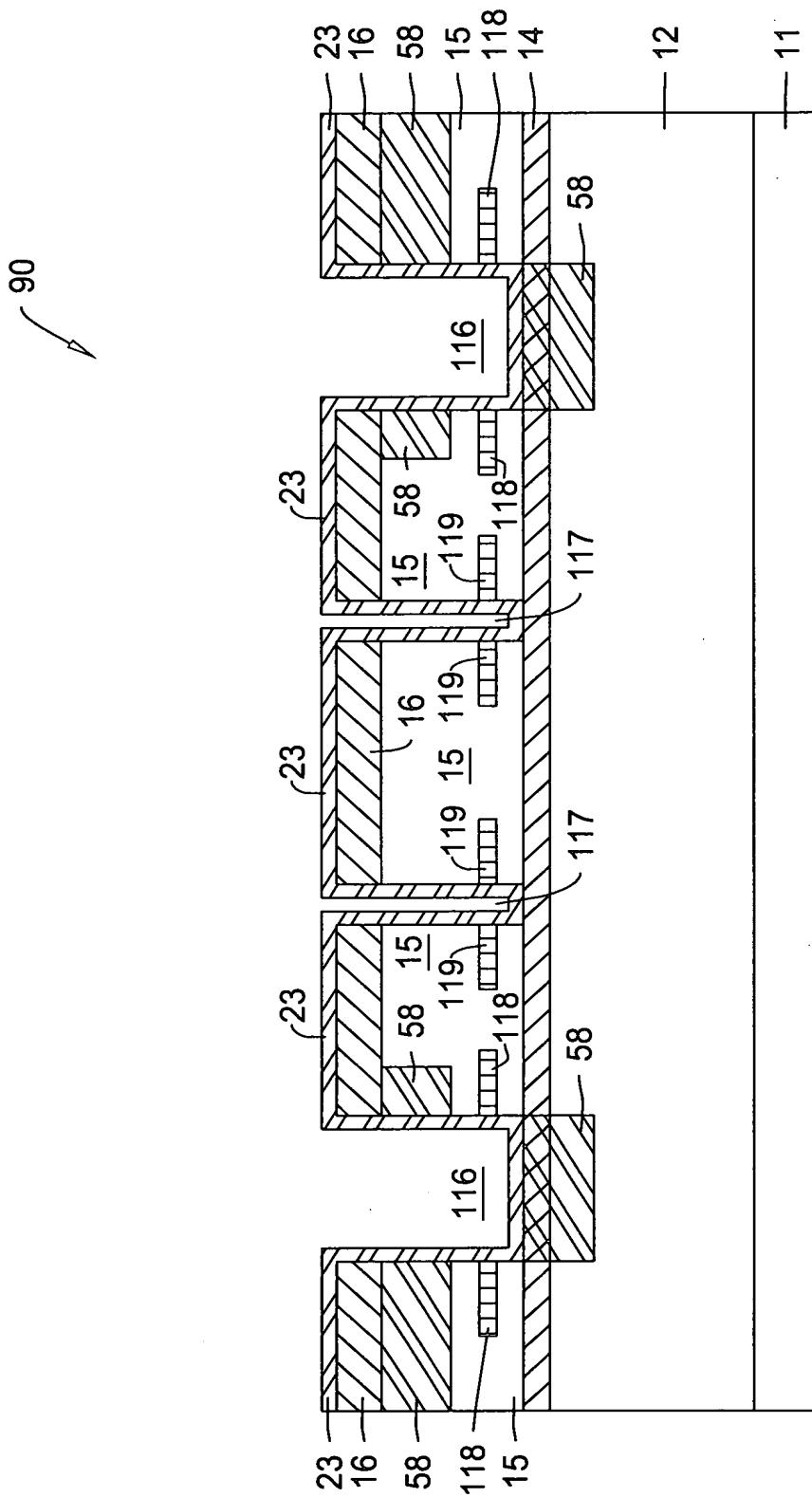


Figure 156

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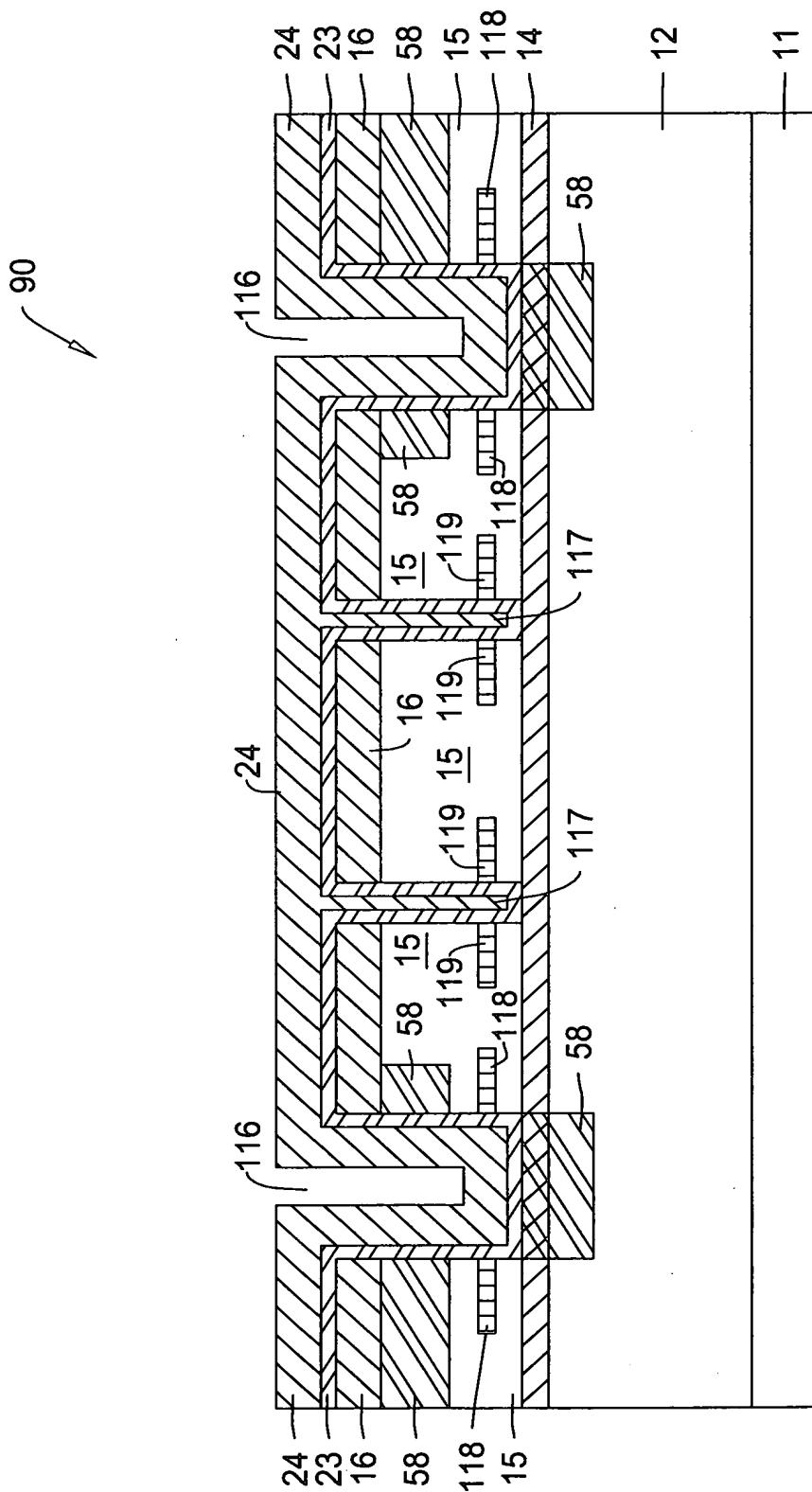


Figure 157

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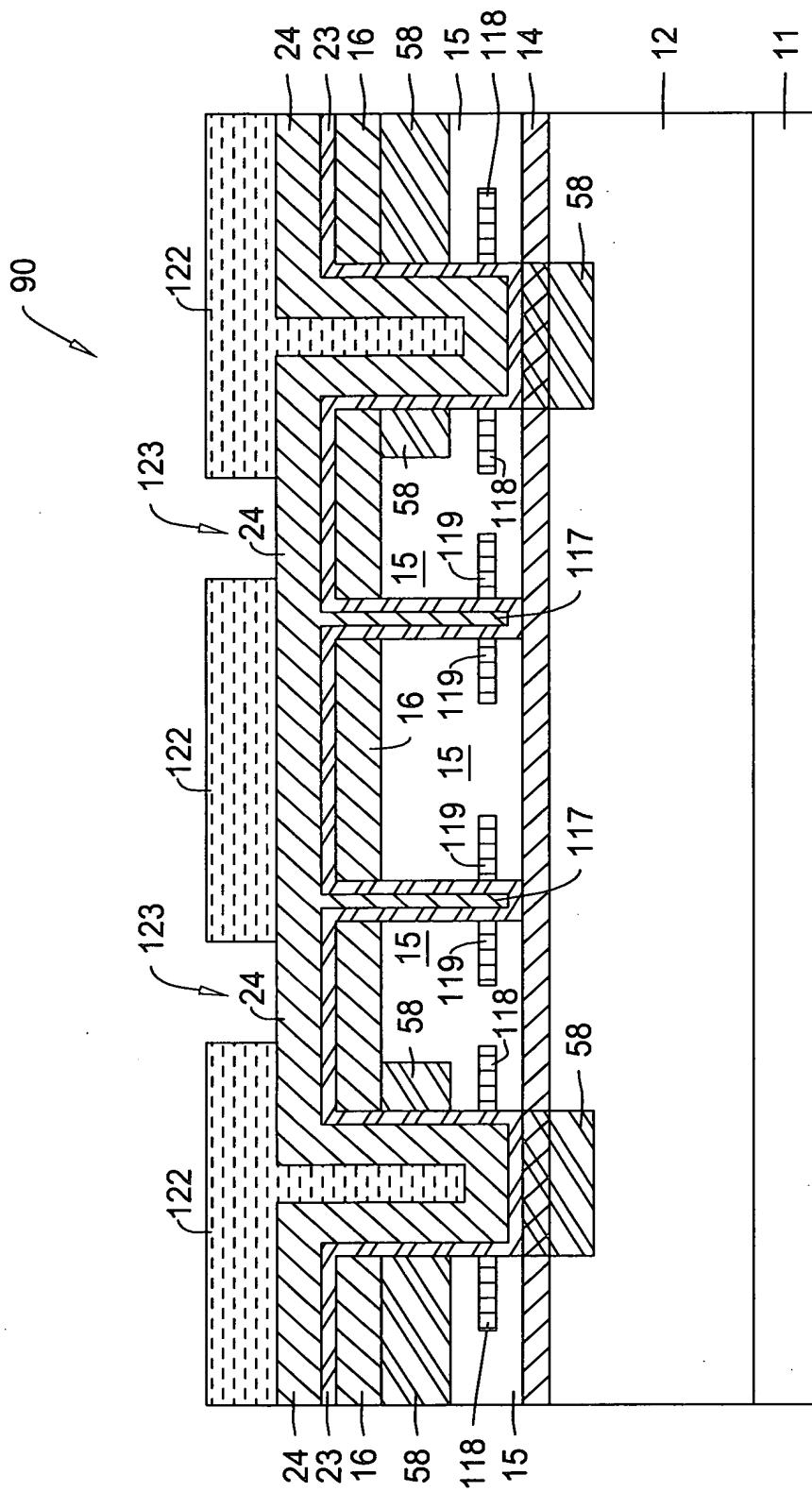


Figure 158

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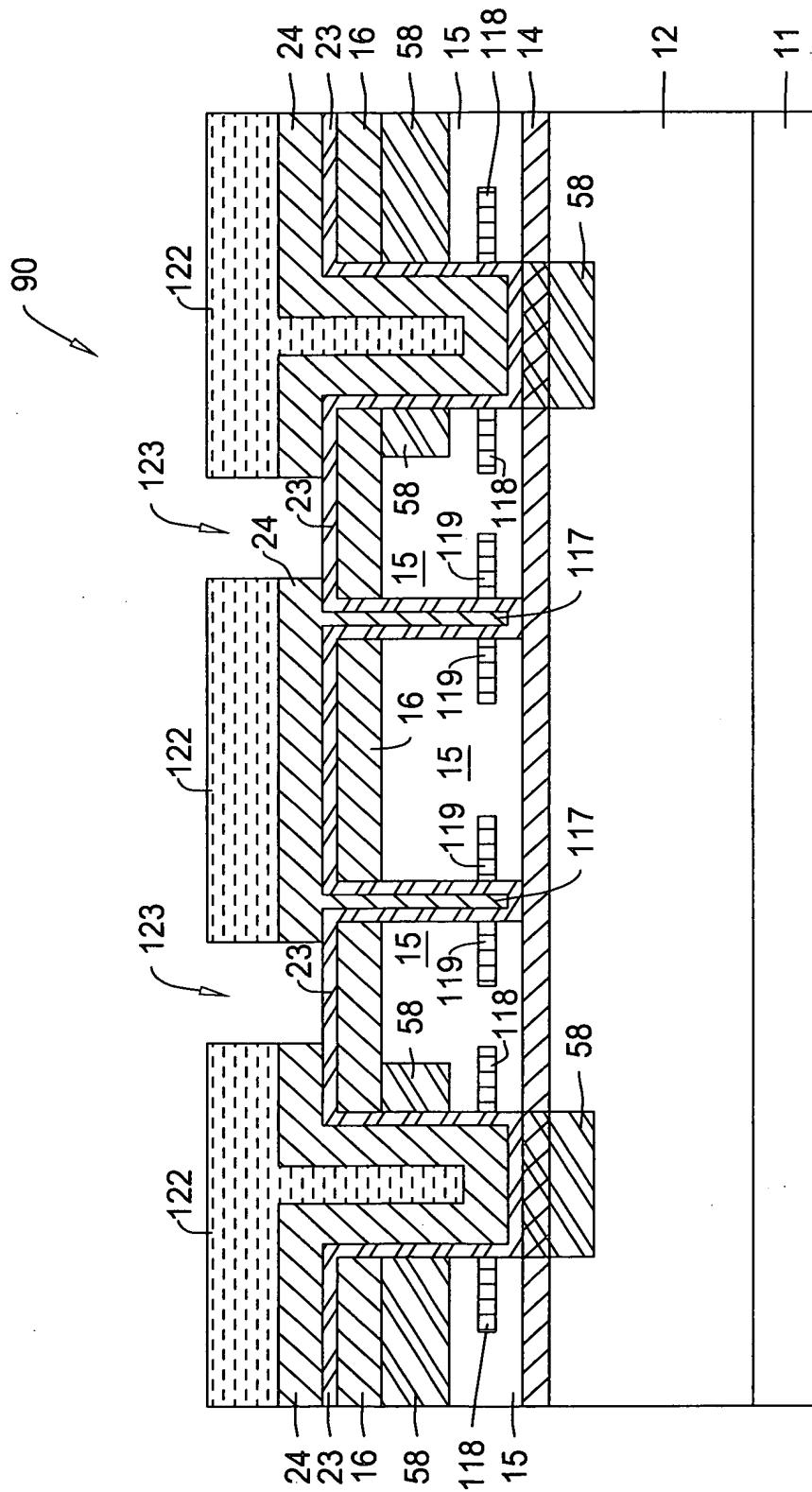


Figure 159

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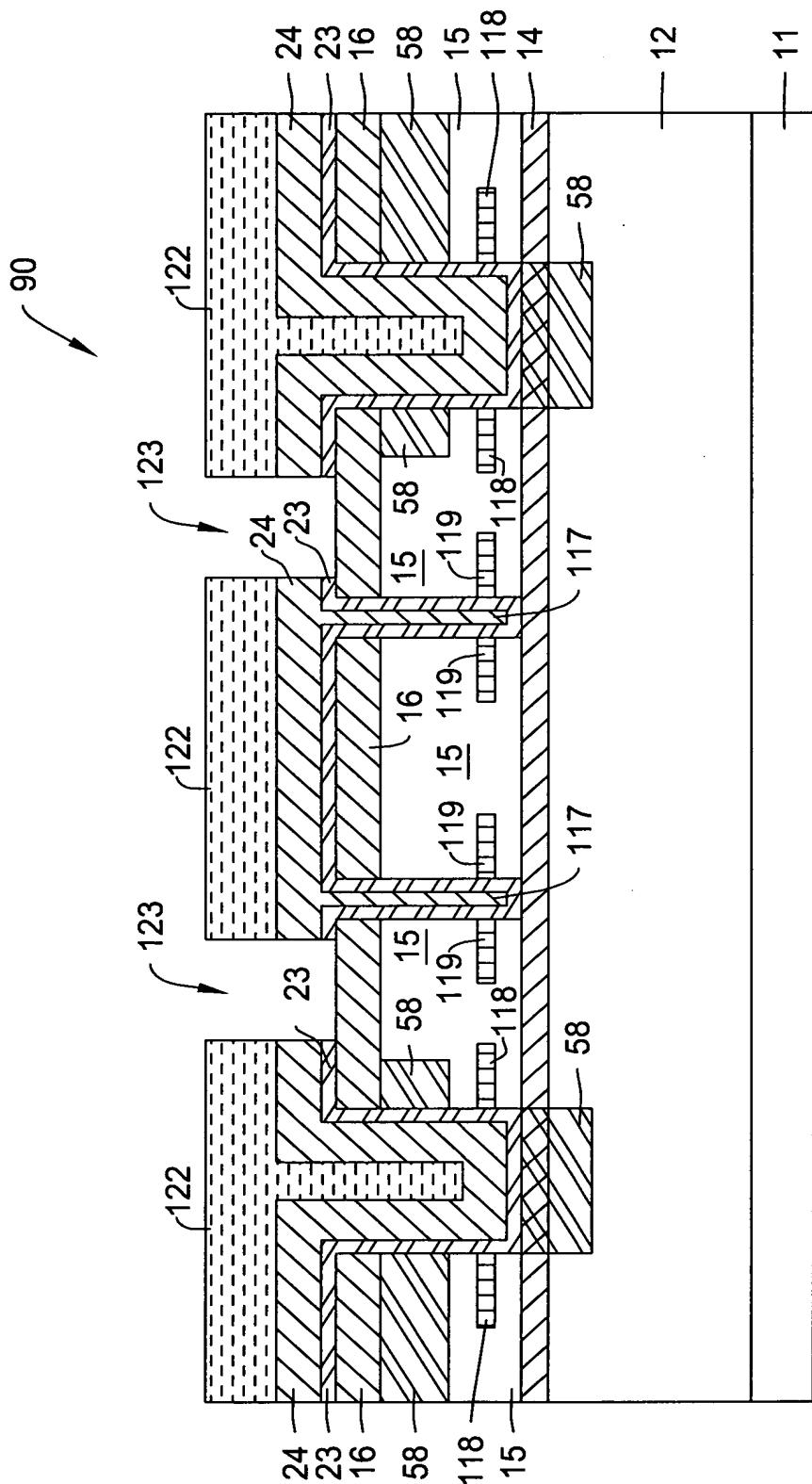


Figure 160

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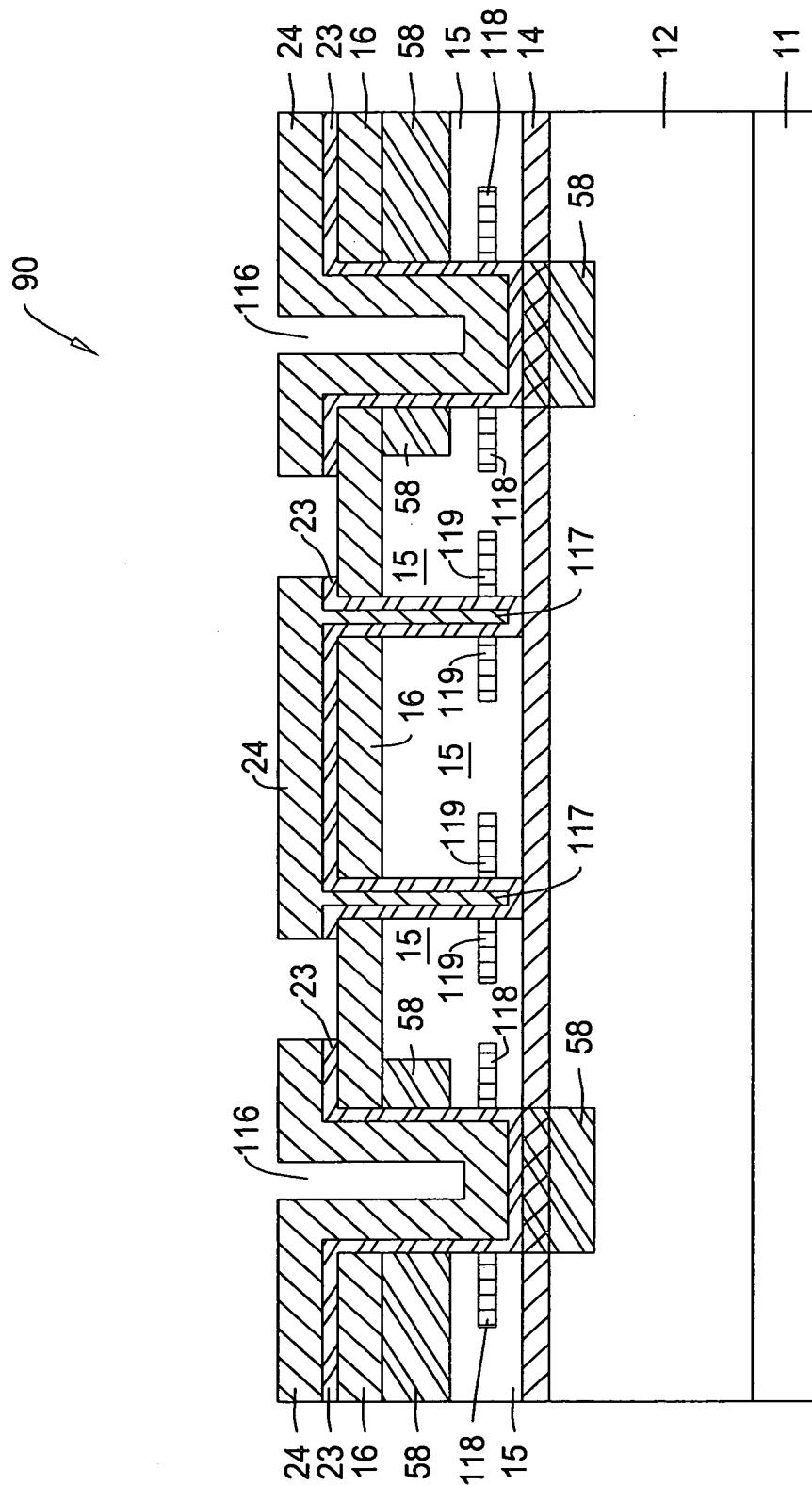


Figure 161

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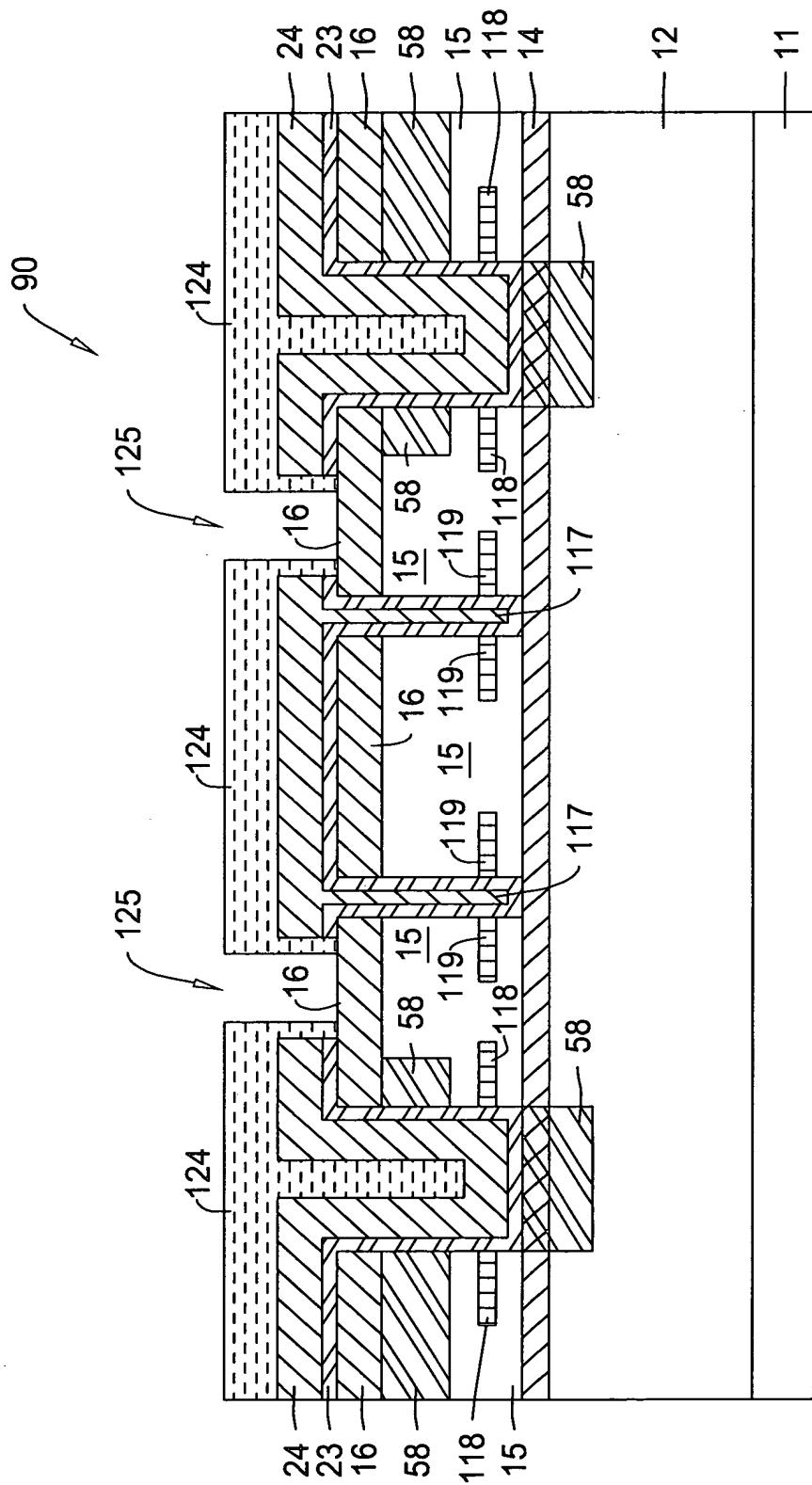


Figure 162

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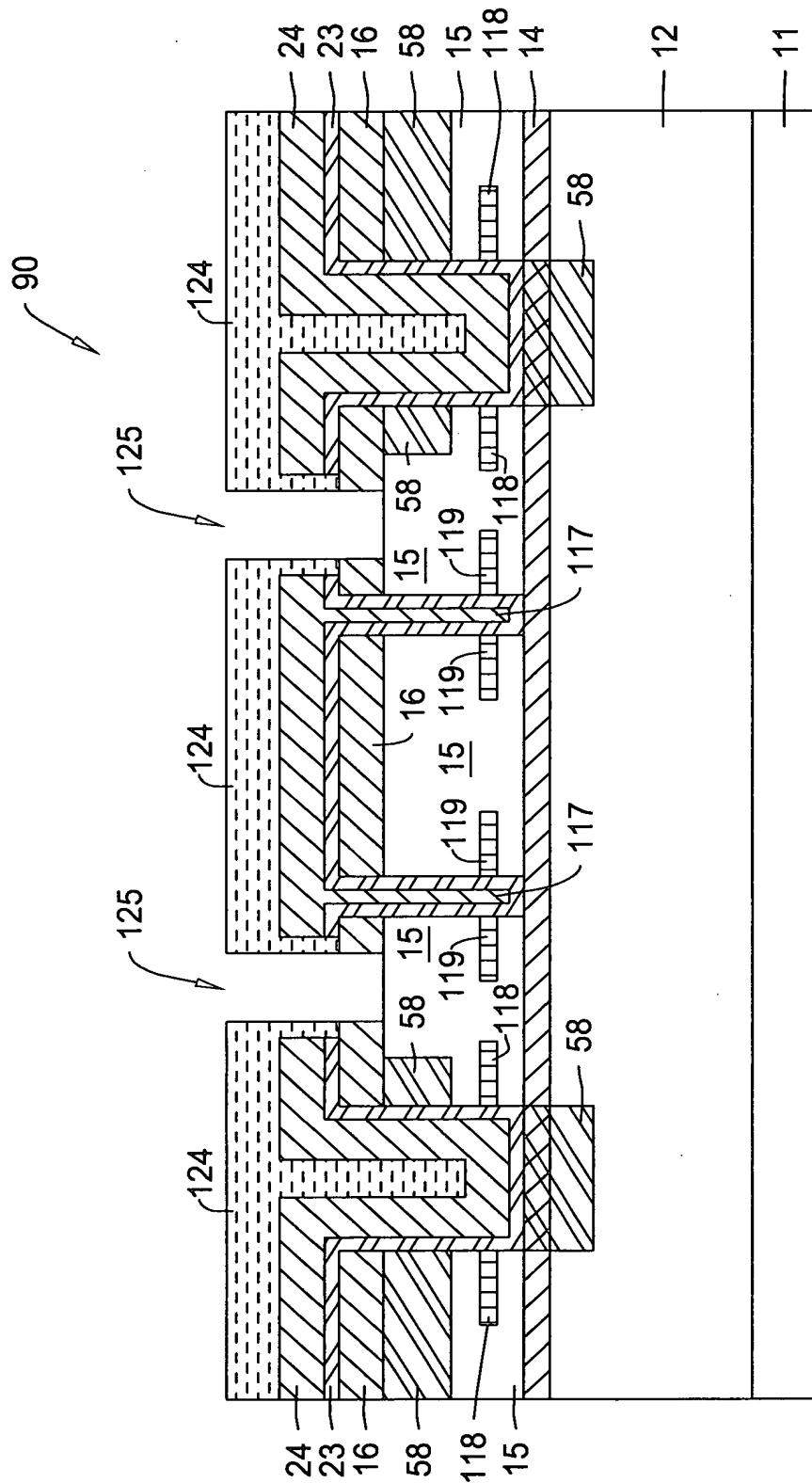


Figure 163

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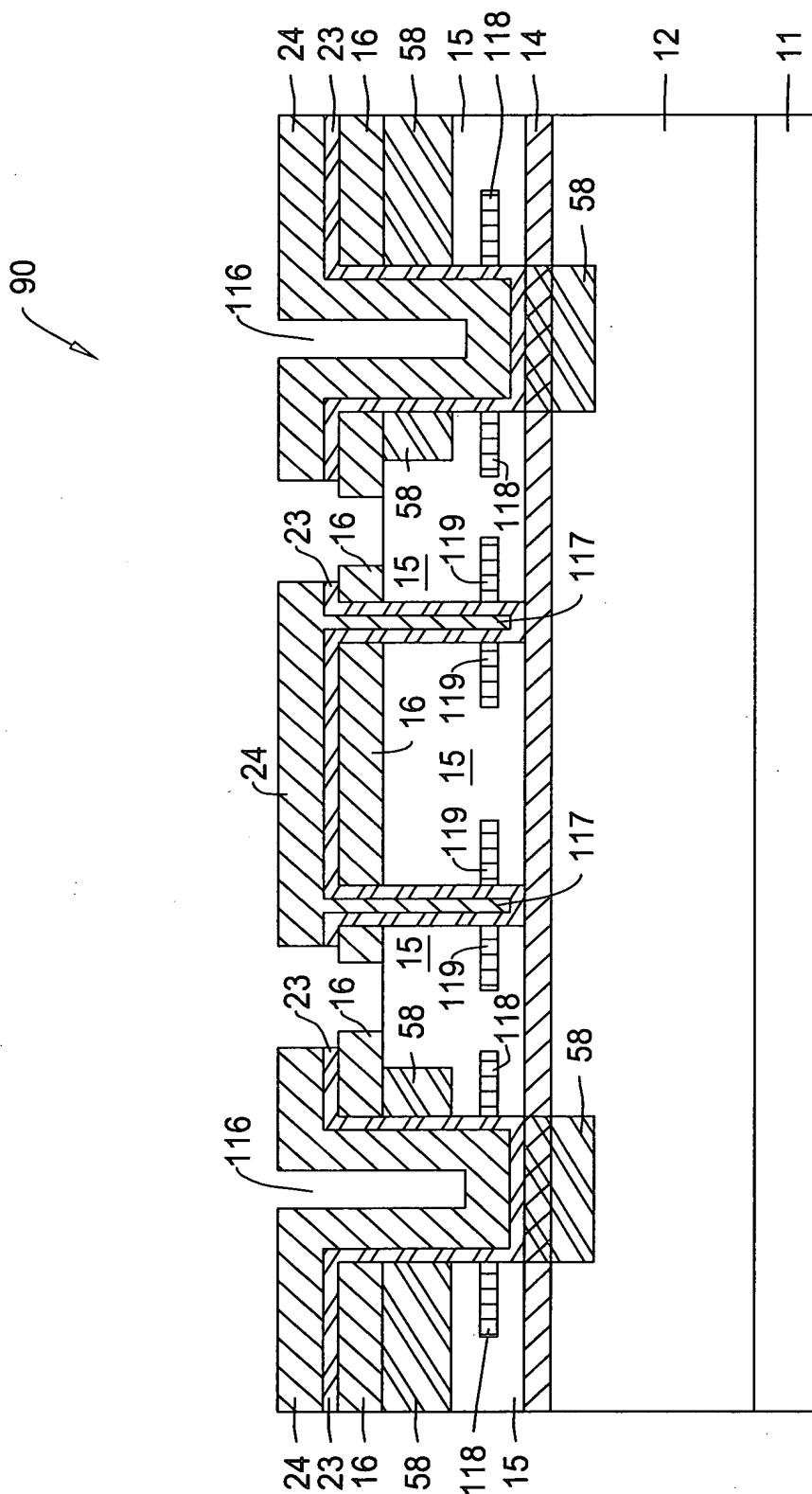


Figure 164

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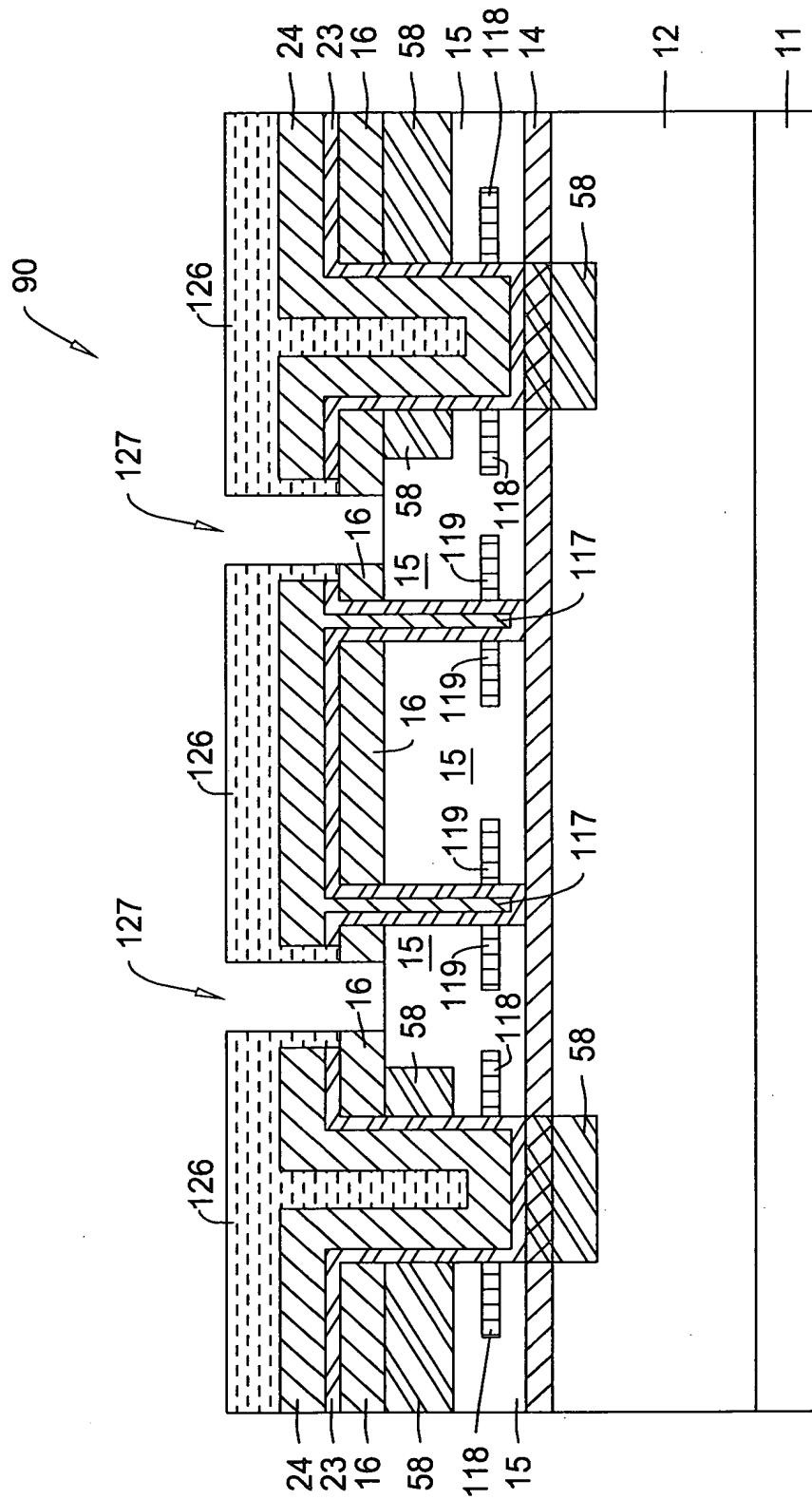


Figure 165

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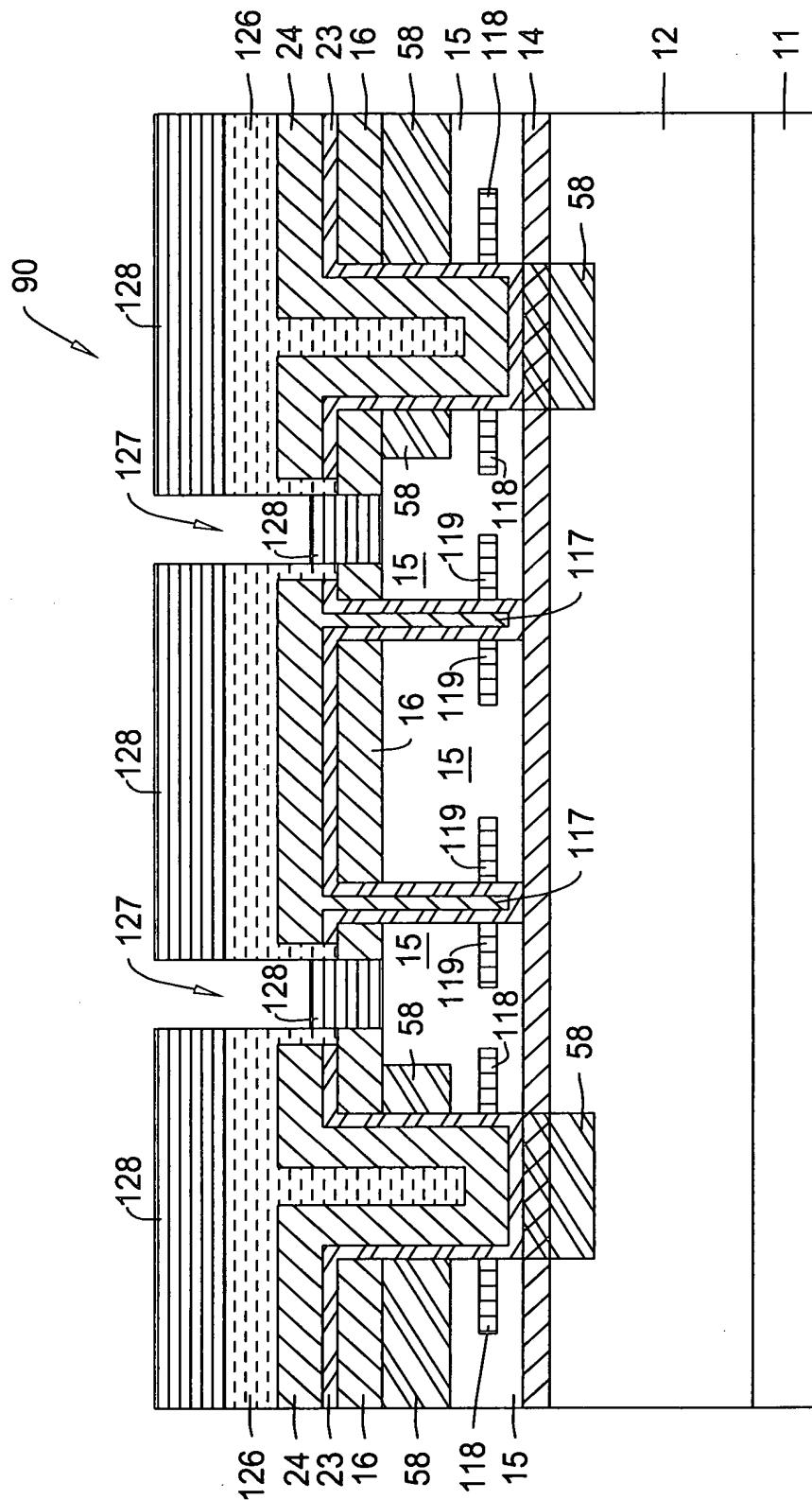


Figure 166

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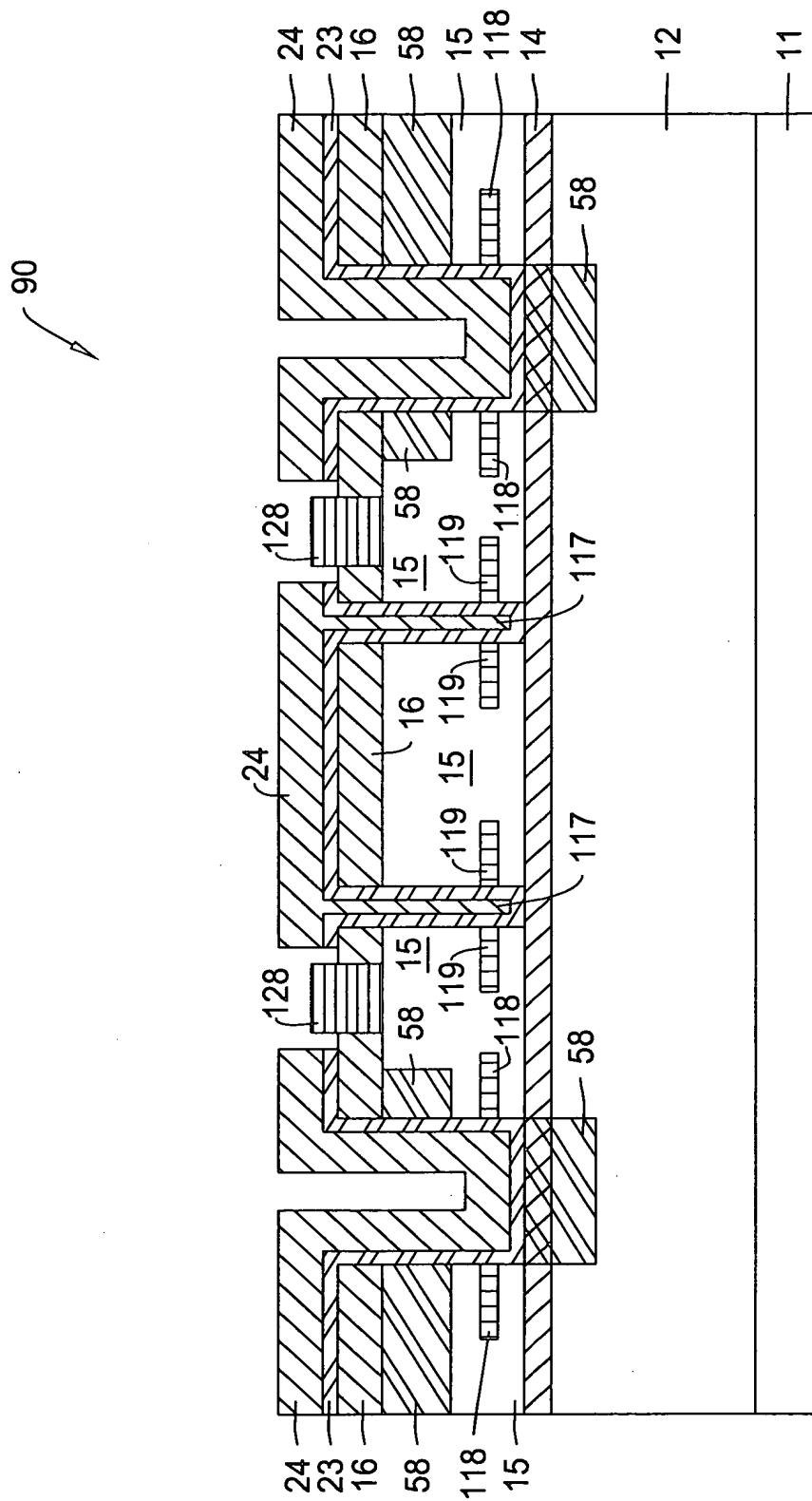


Figure 167

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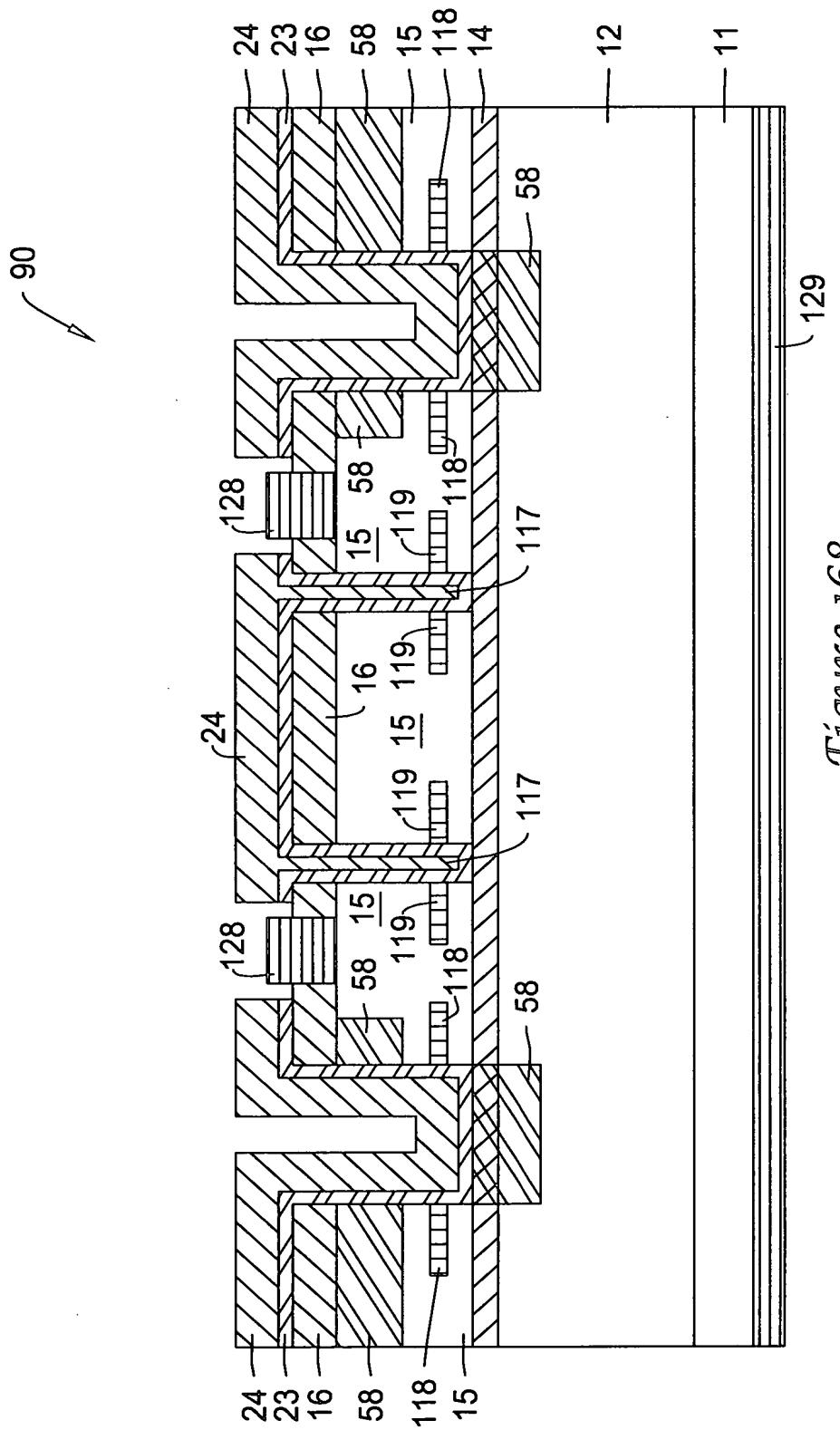


Figure 168

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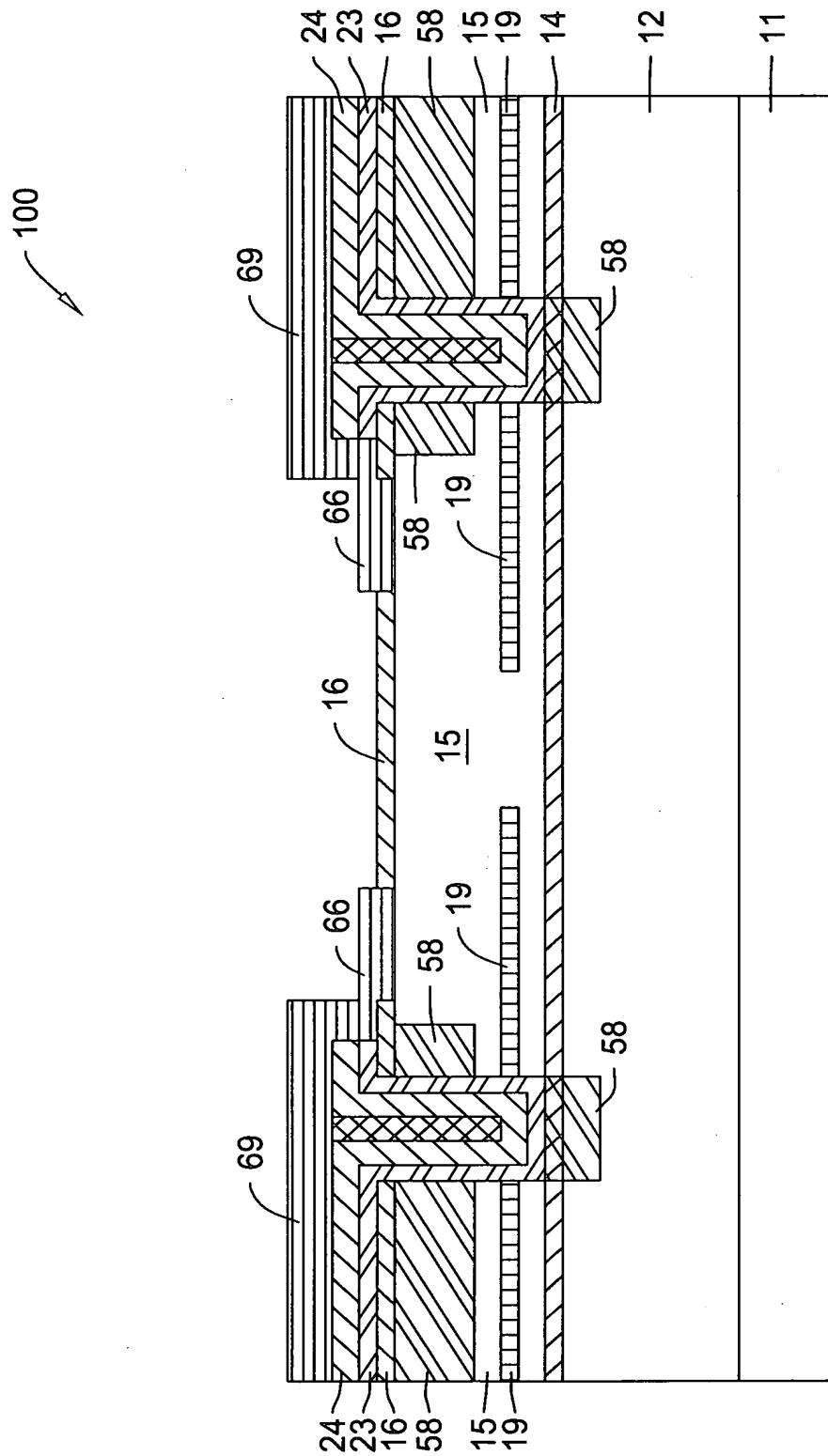


Figure 169

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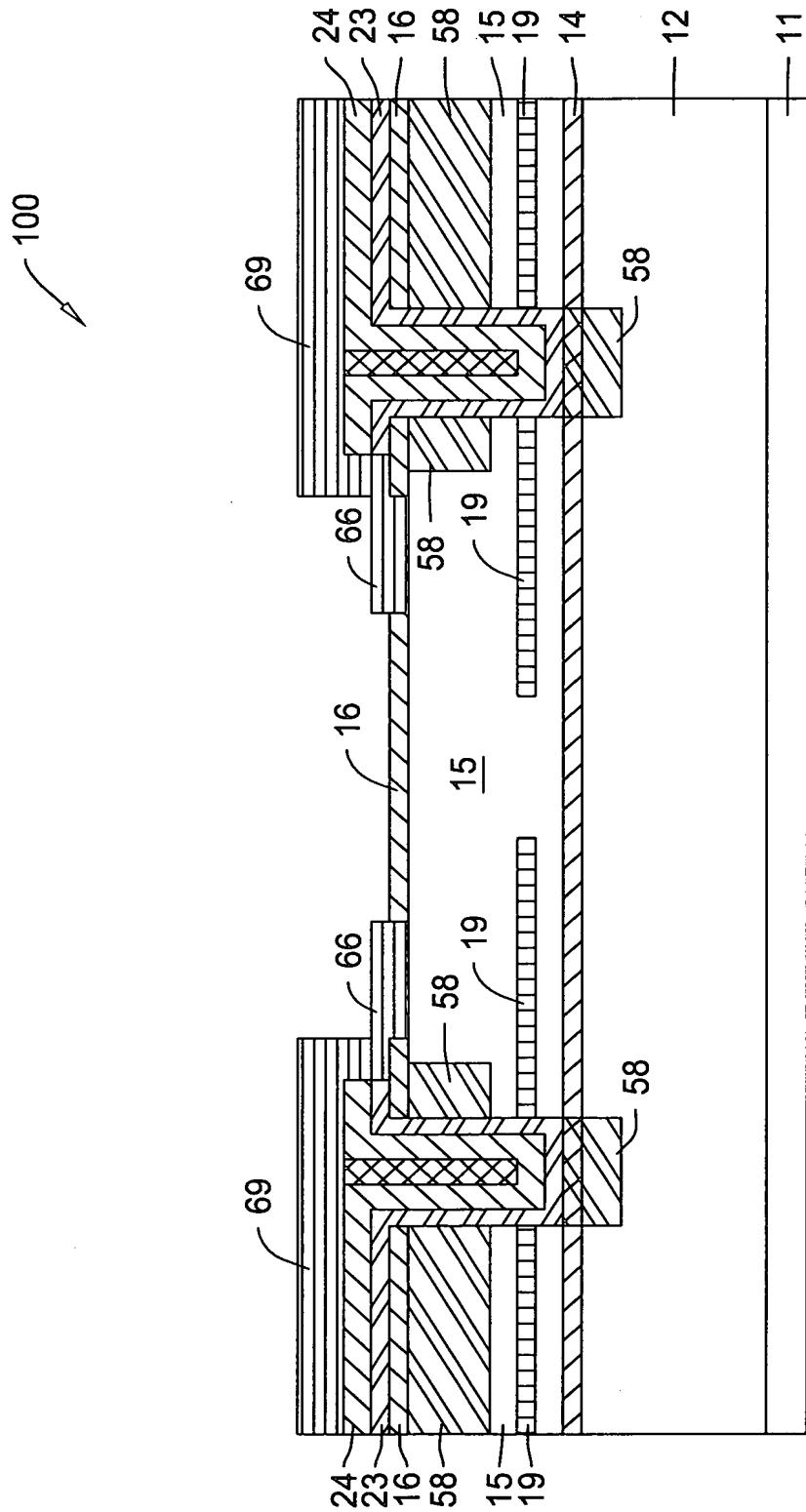


Figure 170

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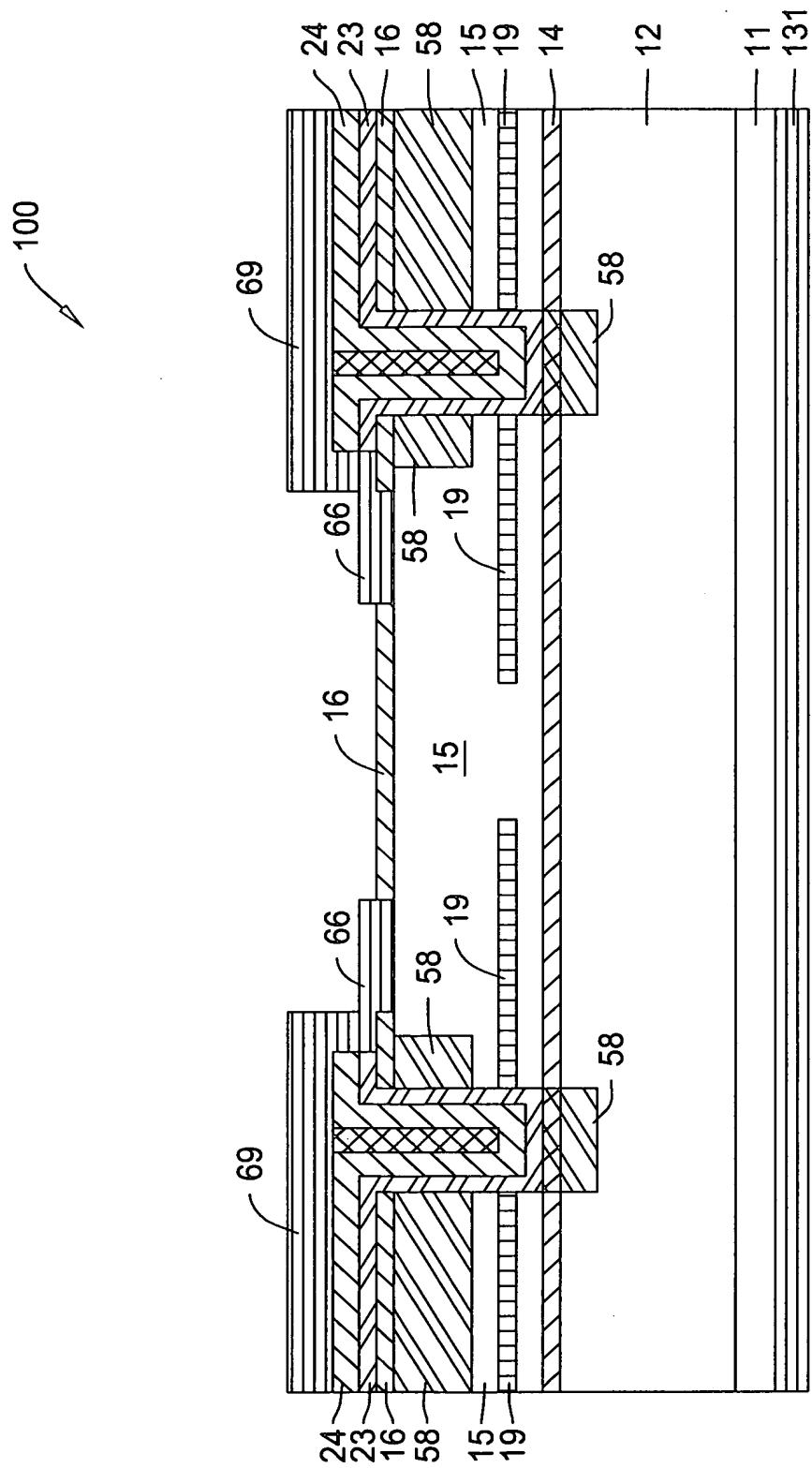


Figure 171

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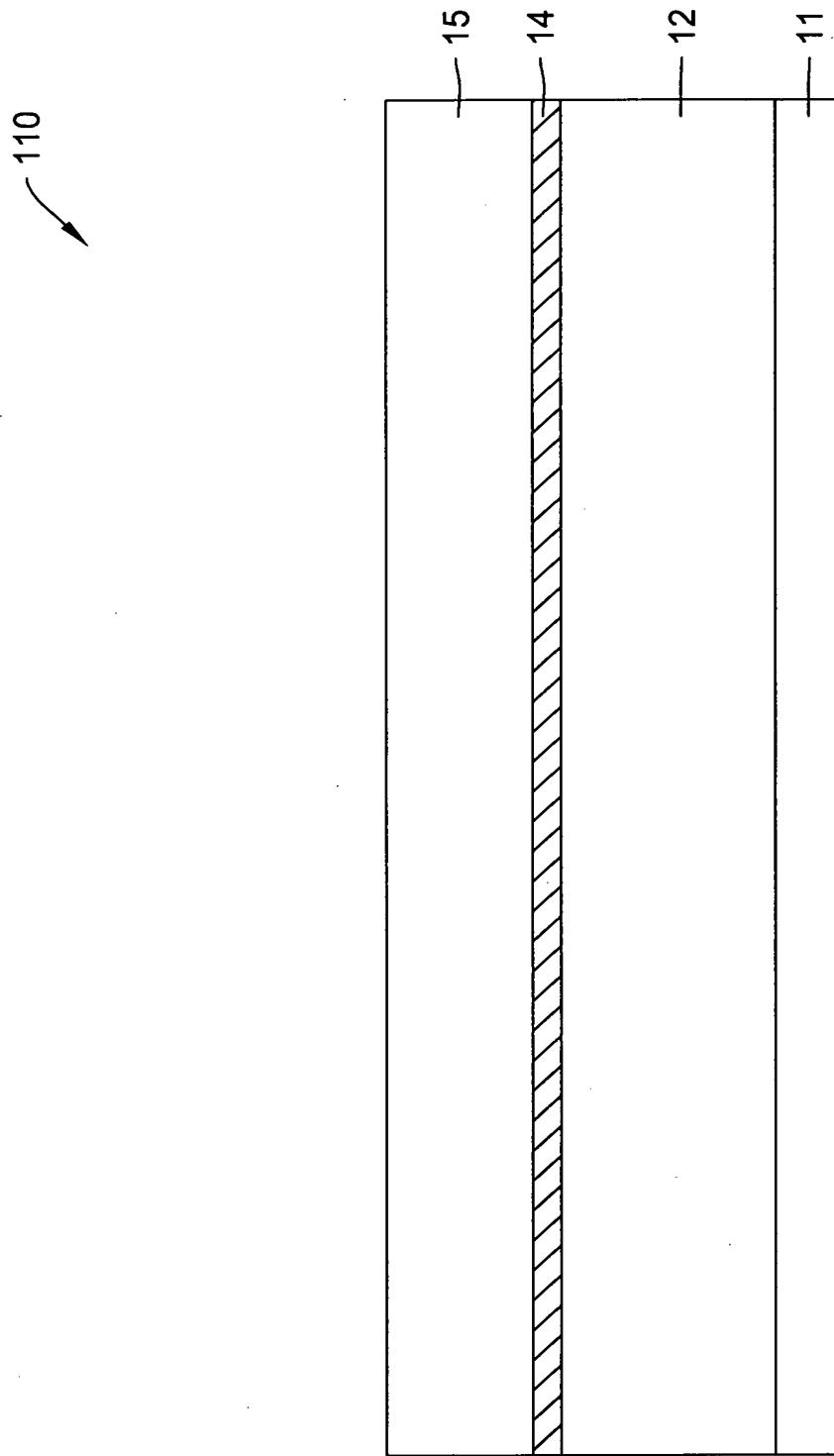


Figure 172

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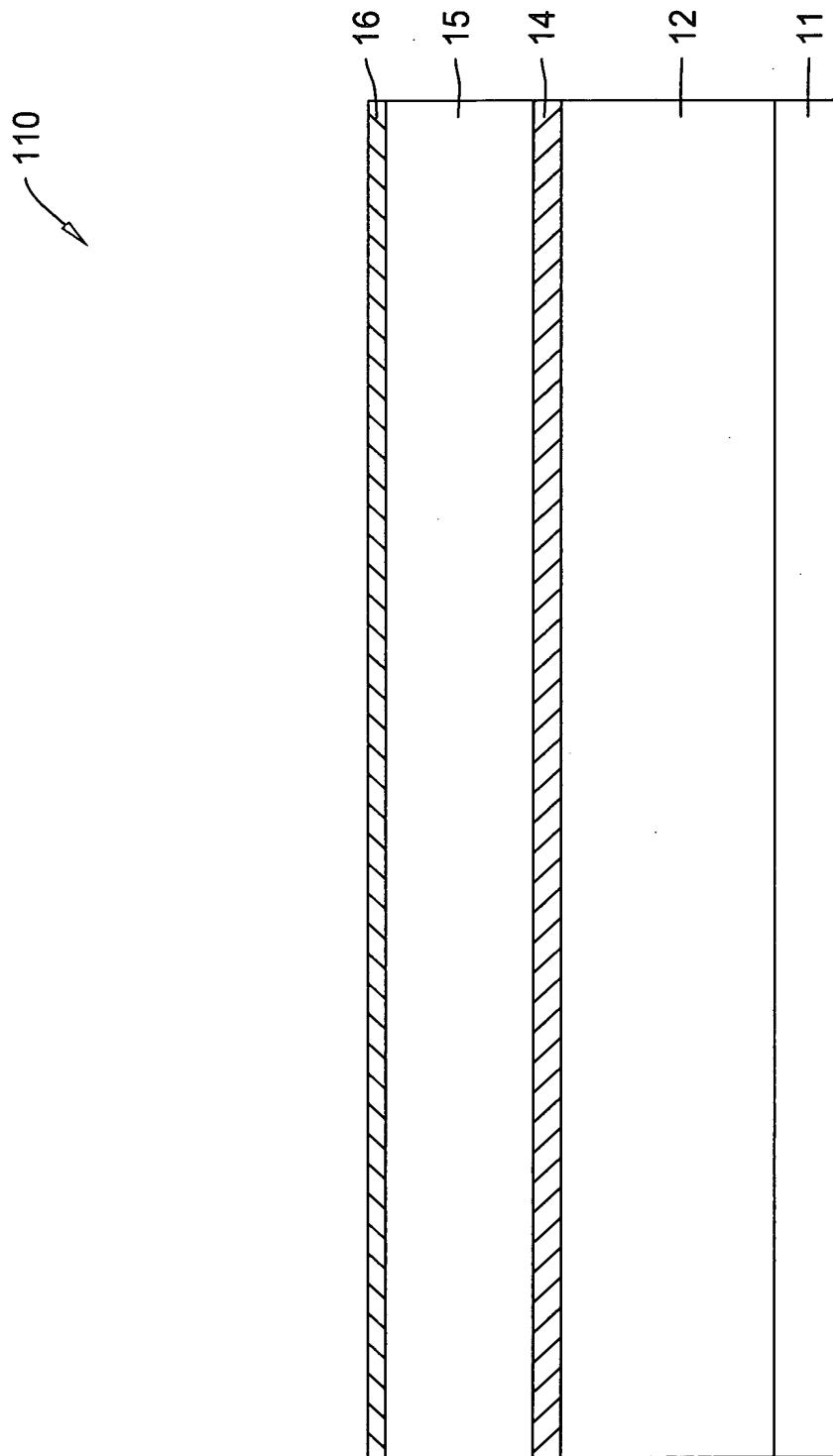


Figure 173

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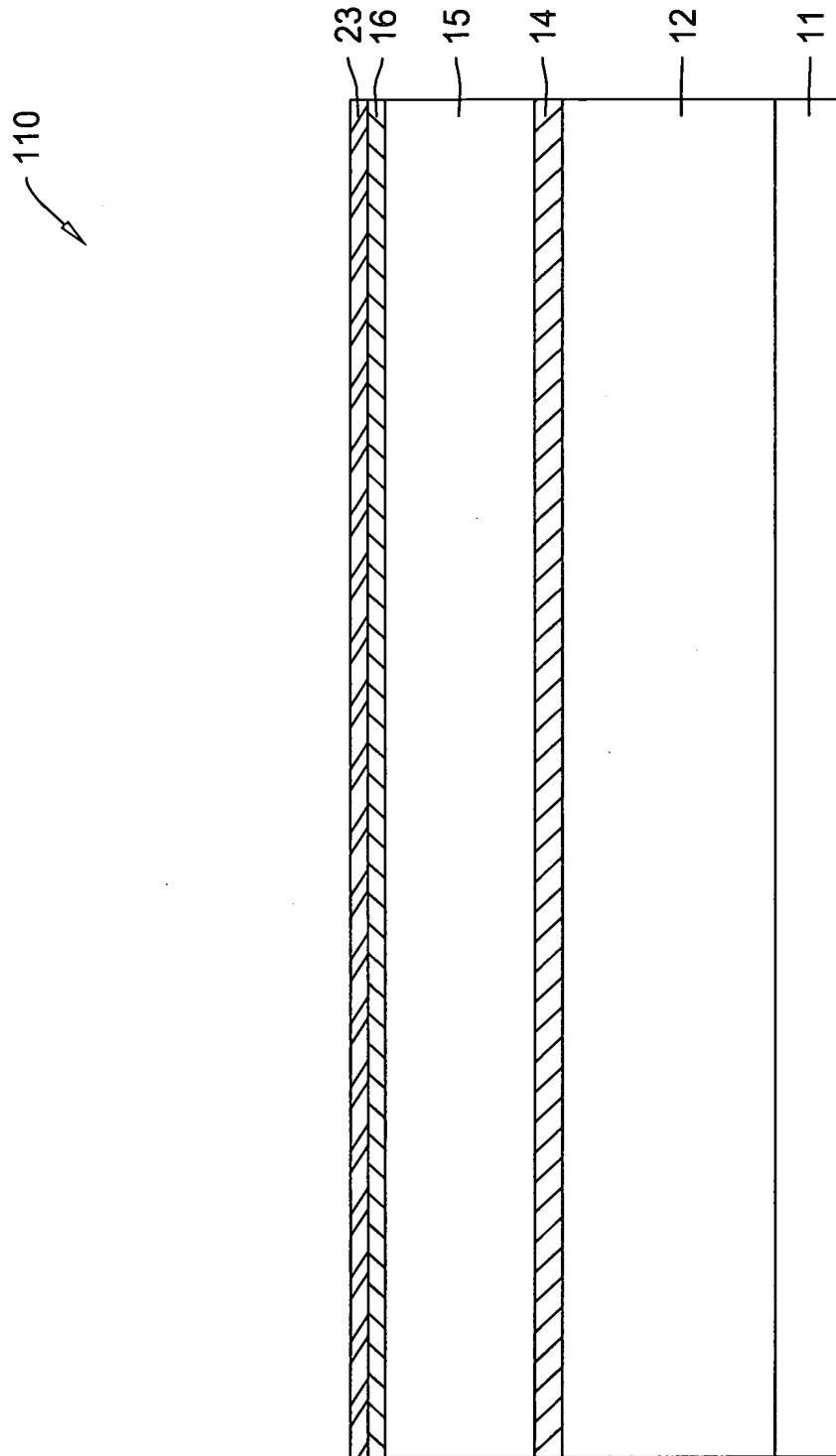


Figure 174

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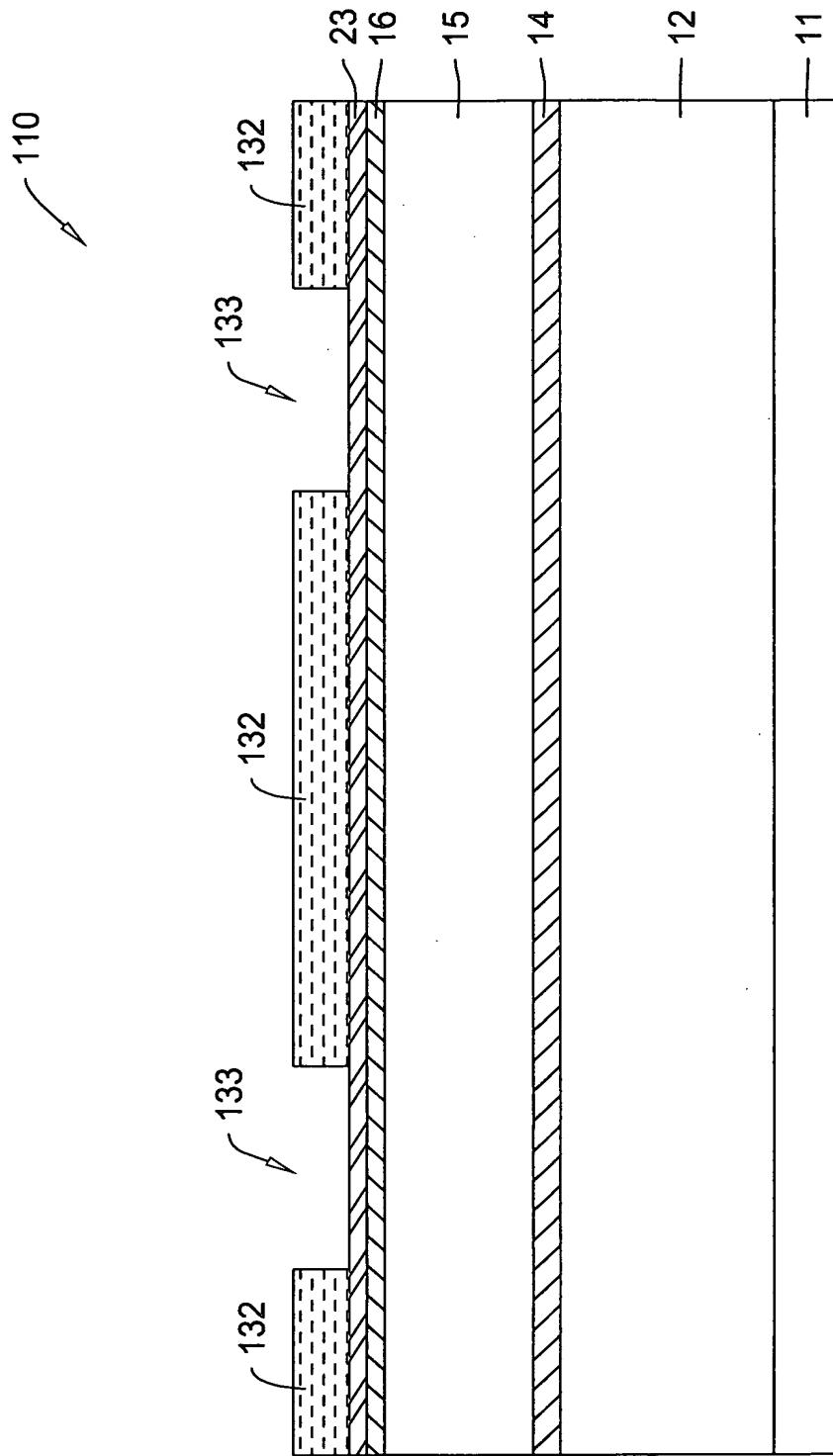


Figure 175

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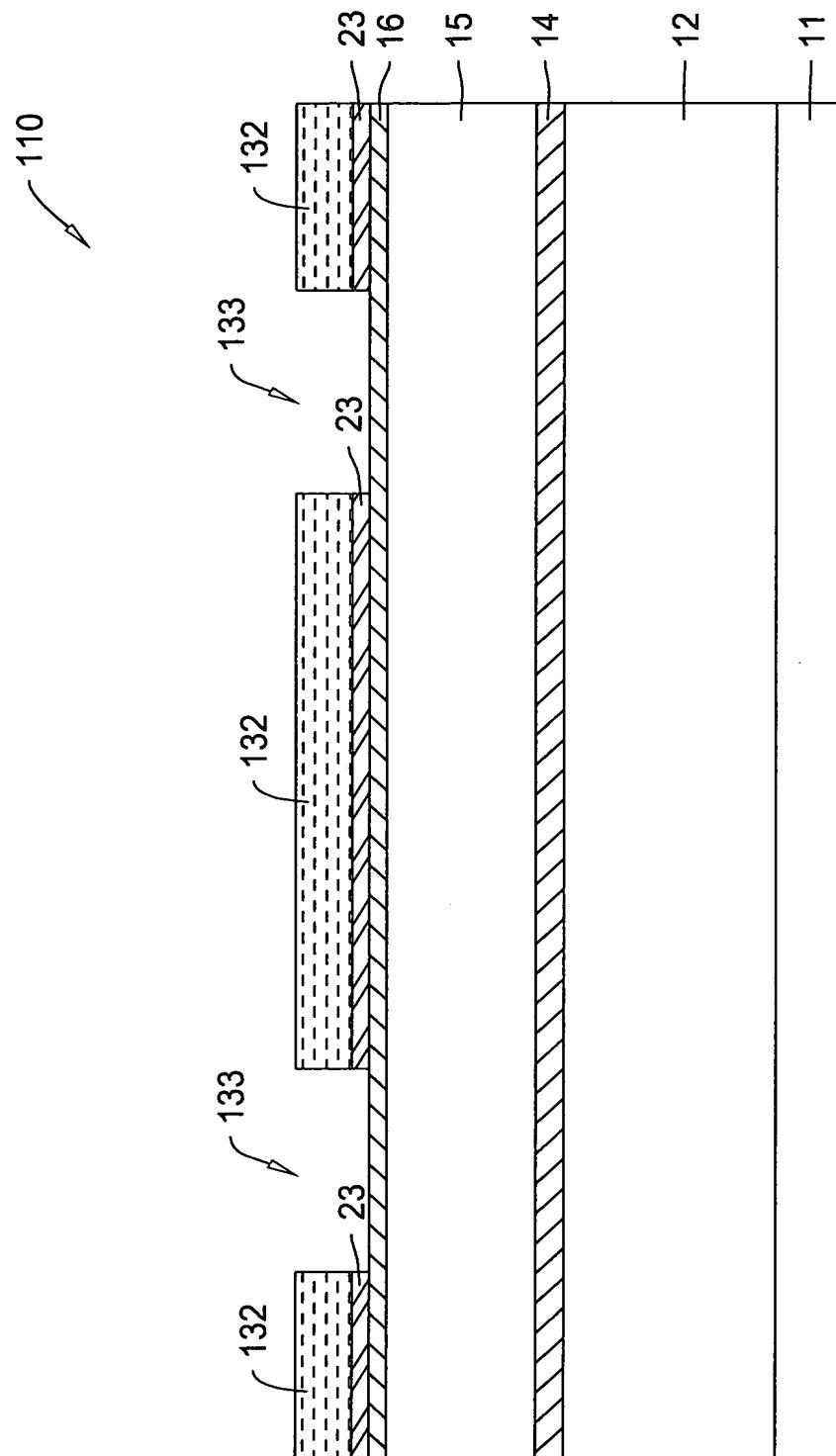


Figure 176

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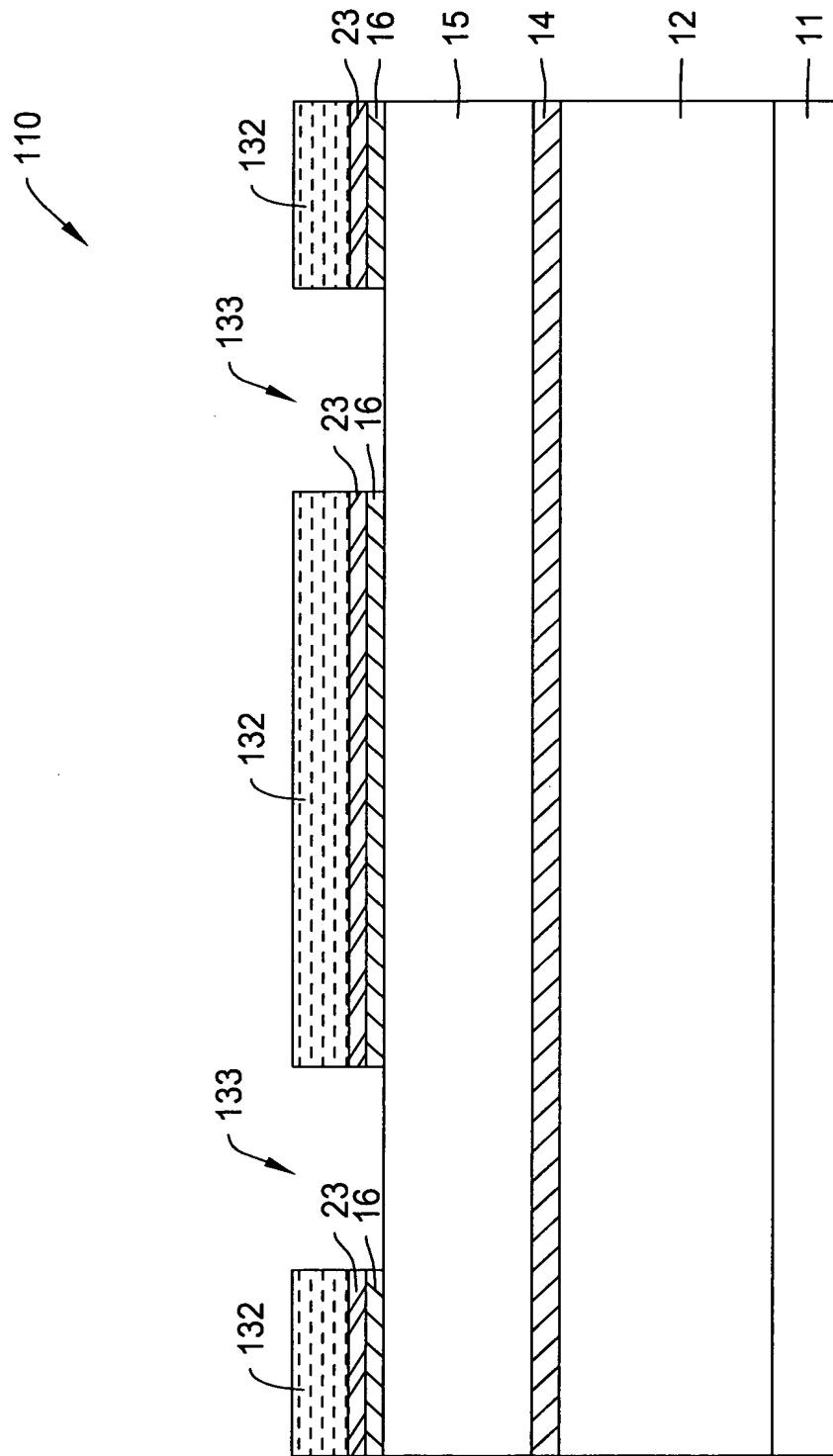


Figure 177

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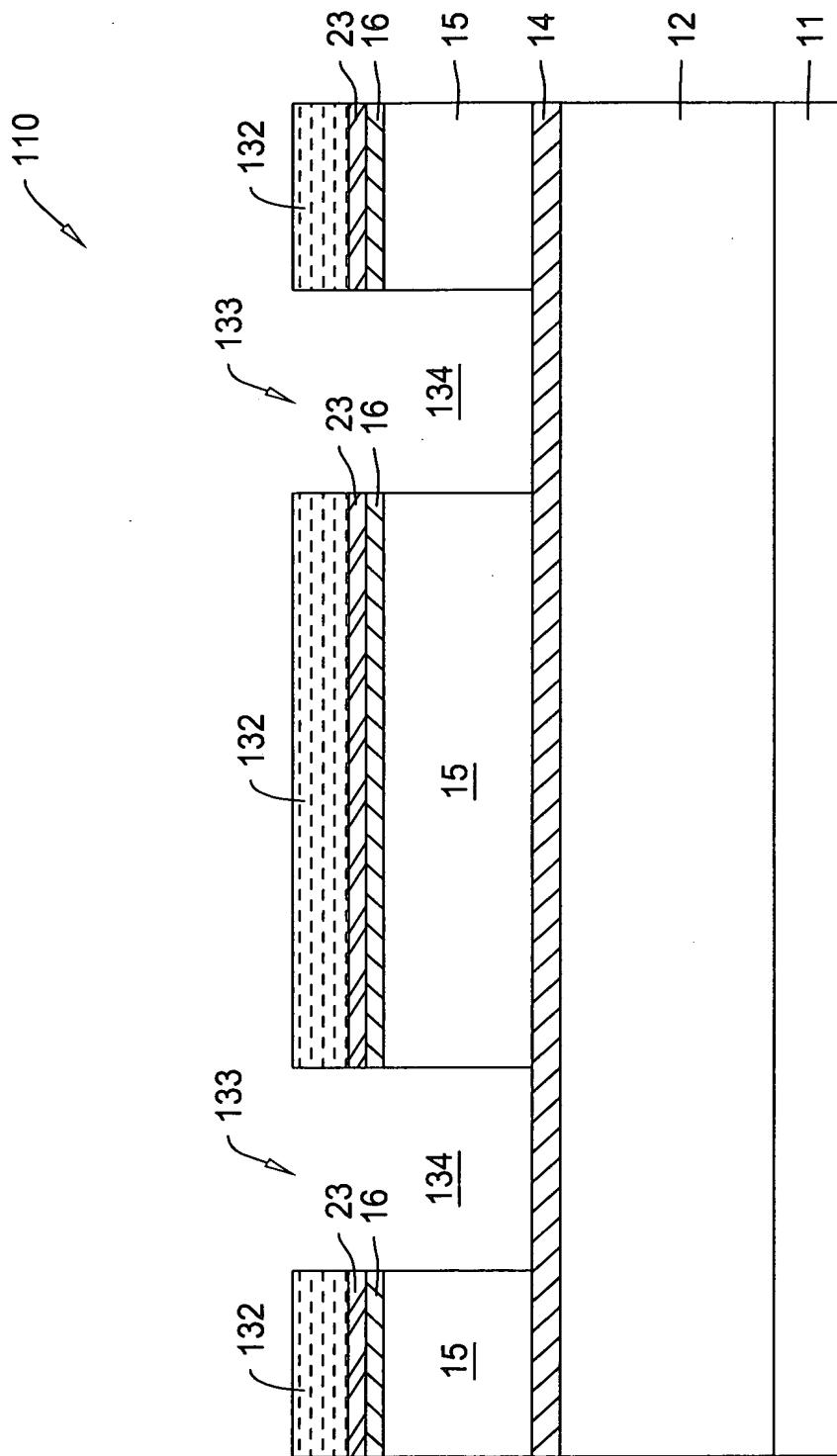


Figure 178

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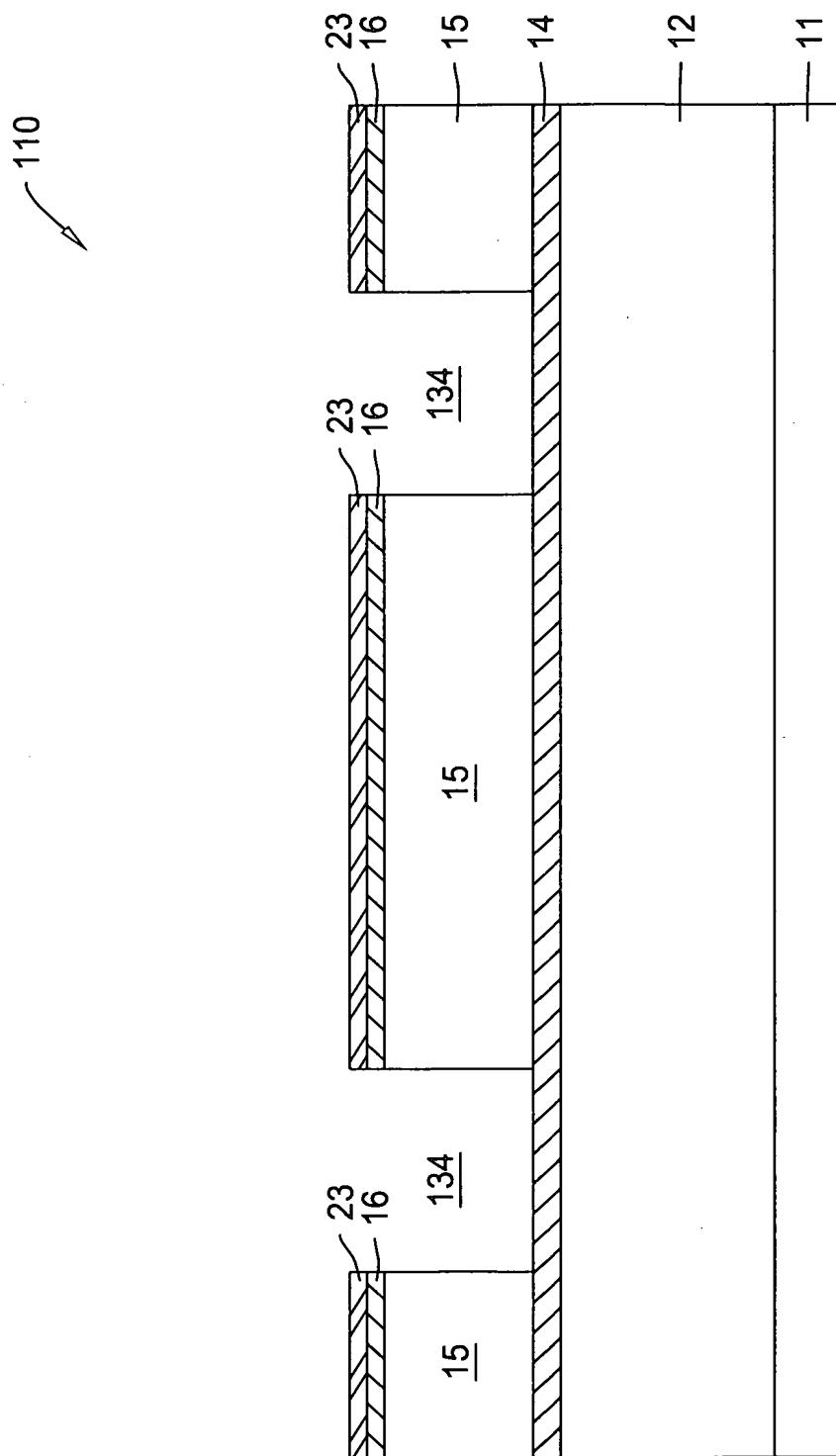


Figure 179

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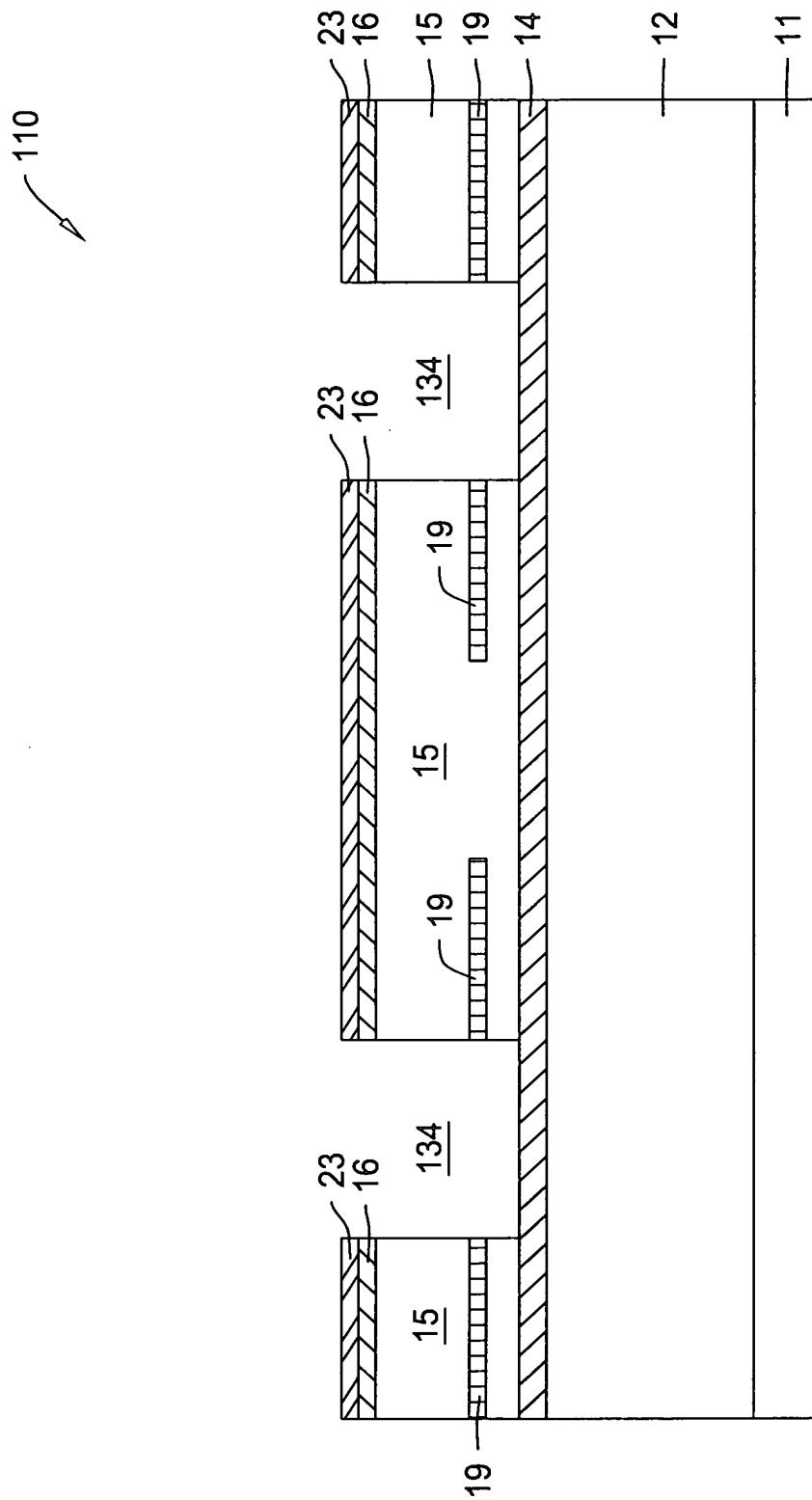


Figure 180

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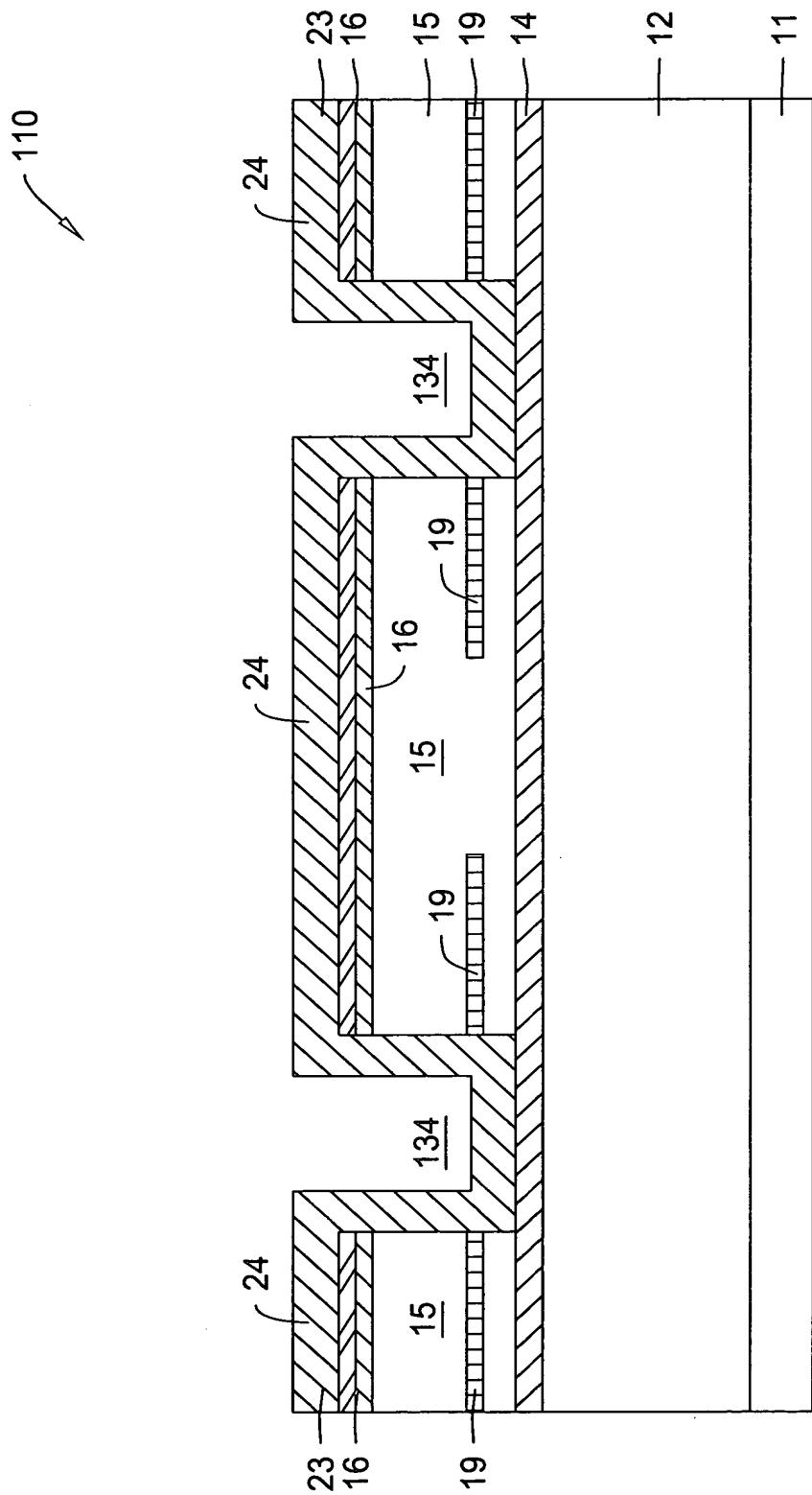


Figure 181

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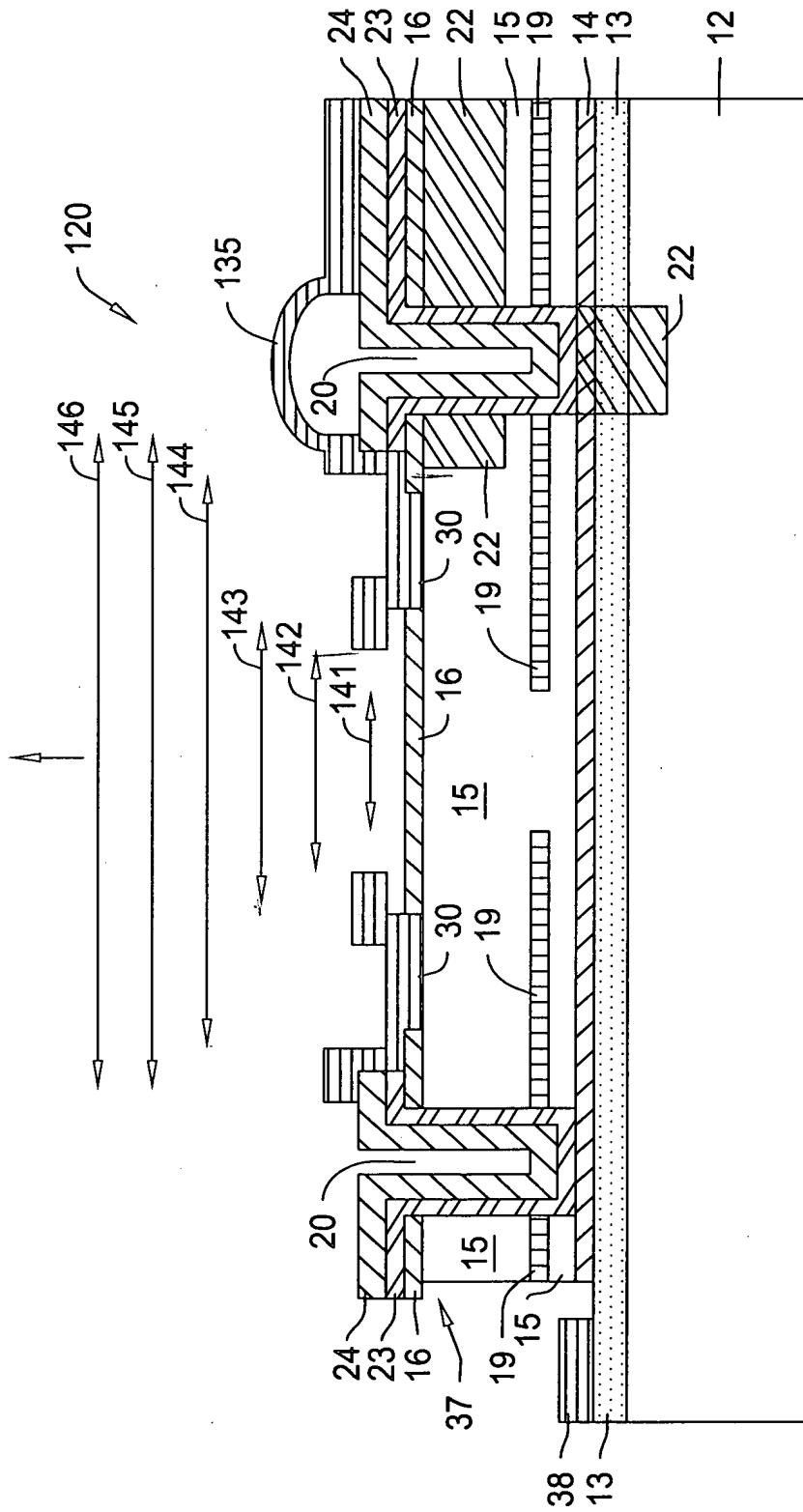


Figure 182

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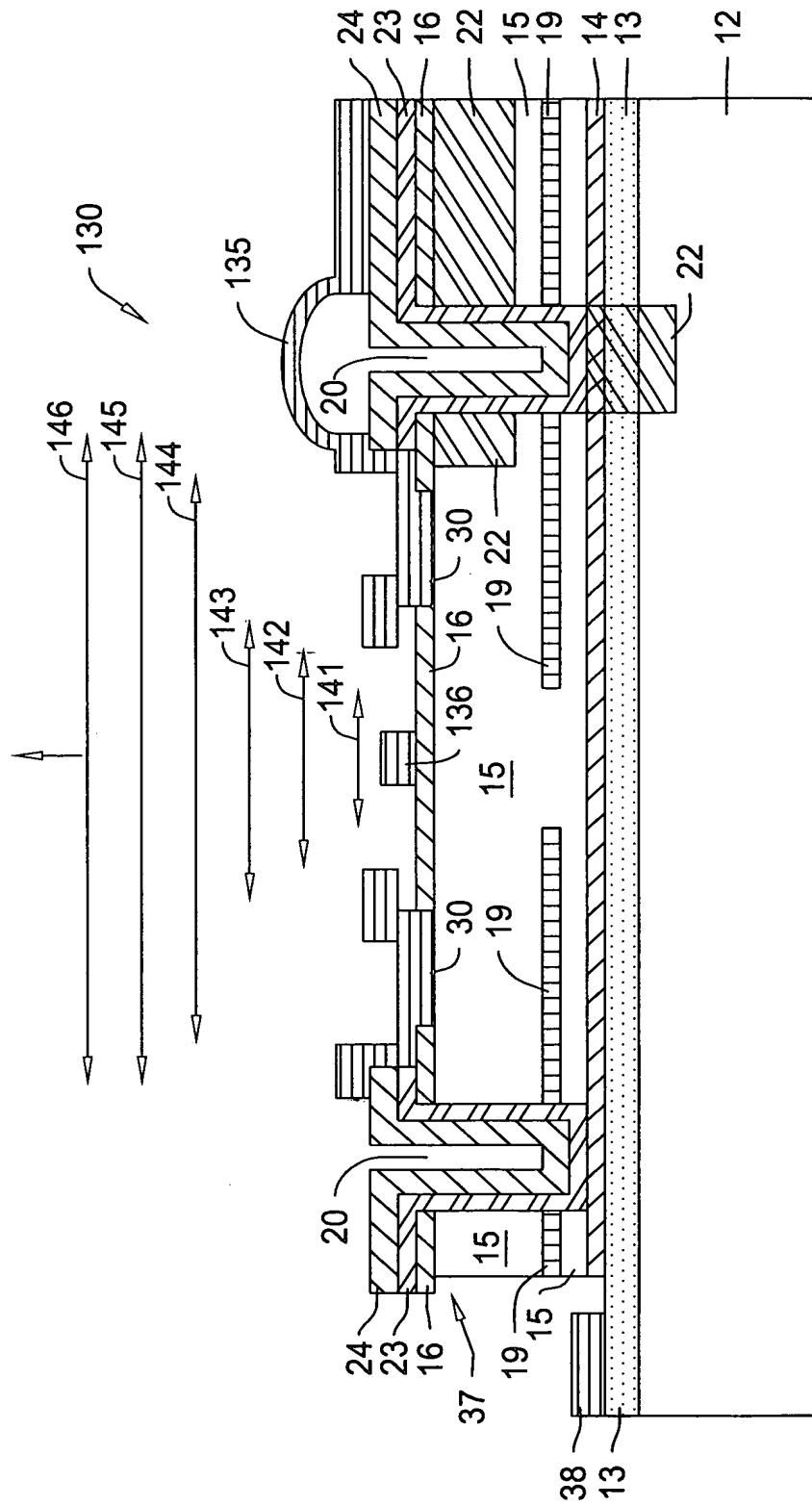


Figure 183

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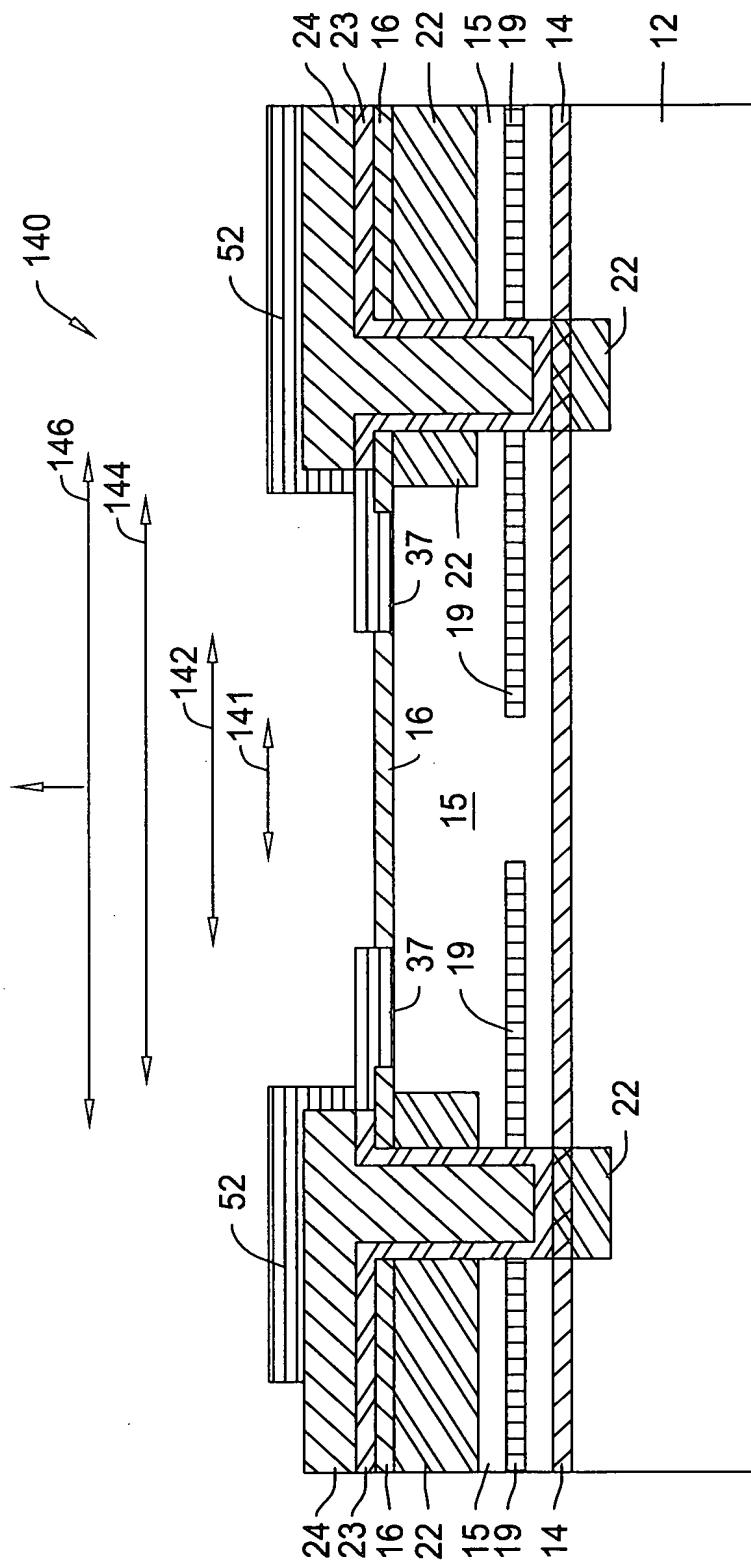


Figure 184

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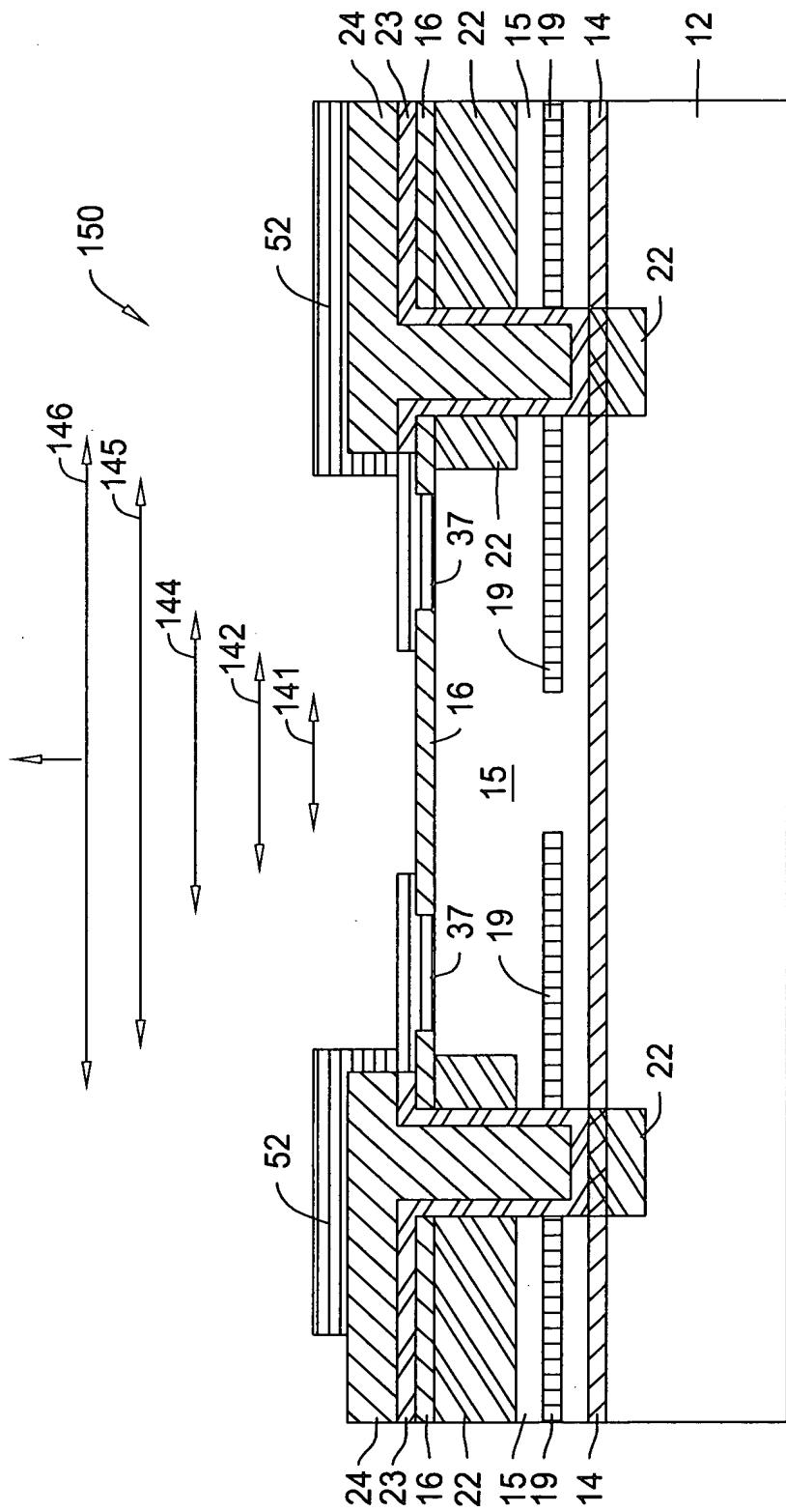


Figure 185

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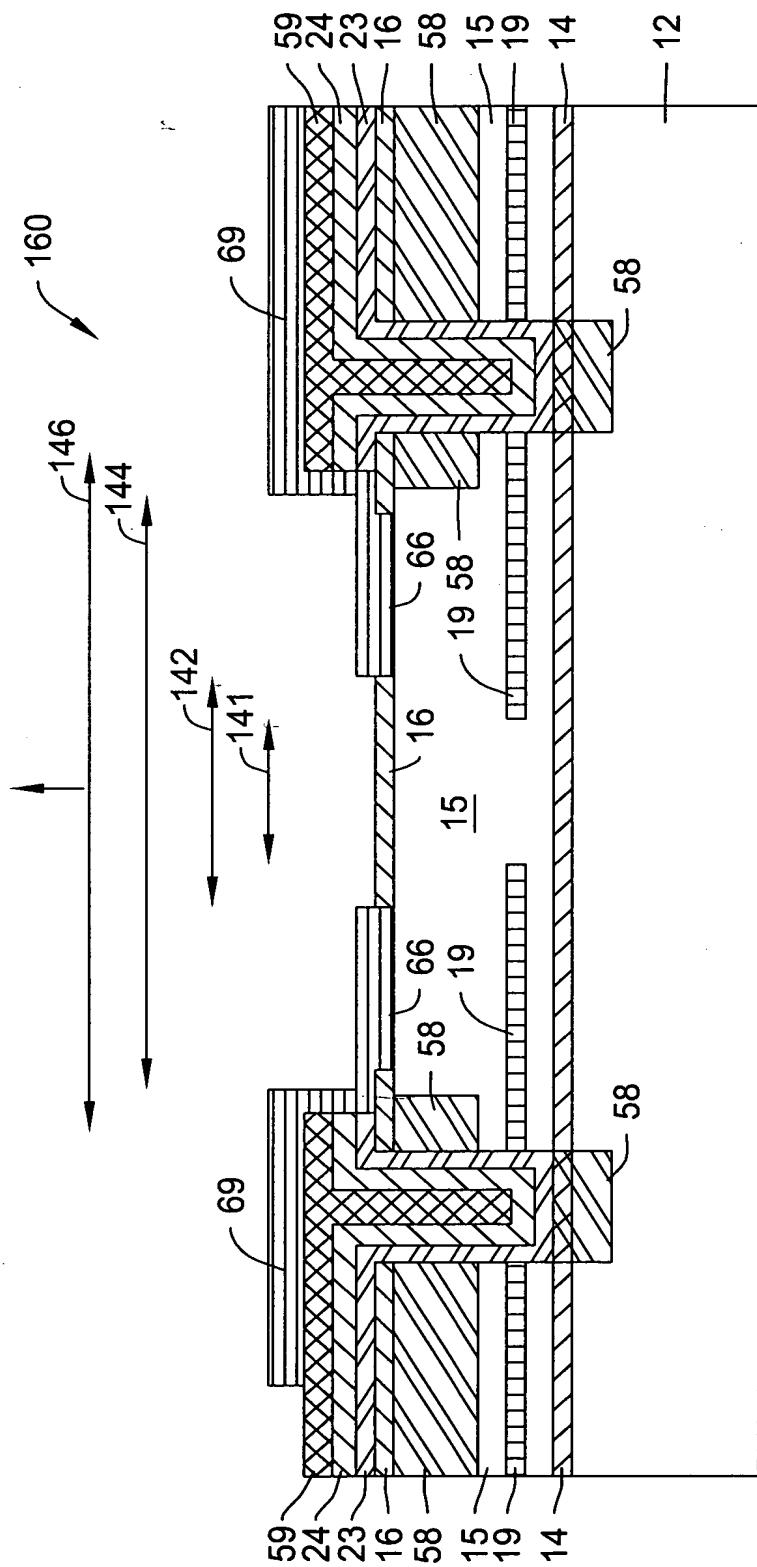


Figure 186

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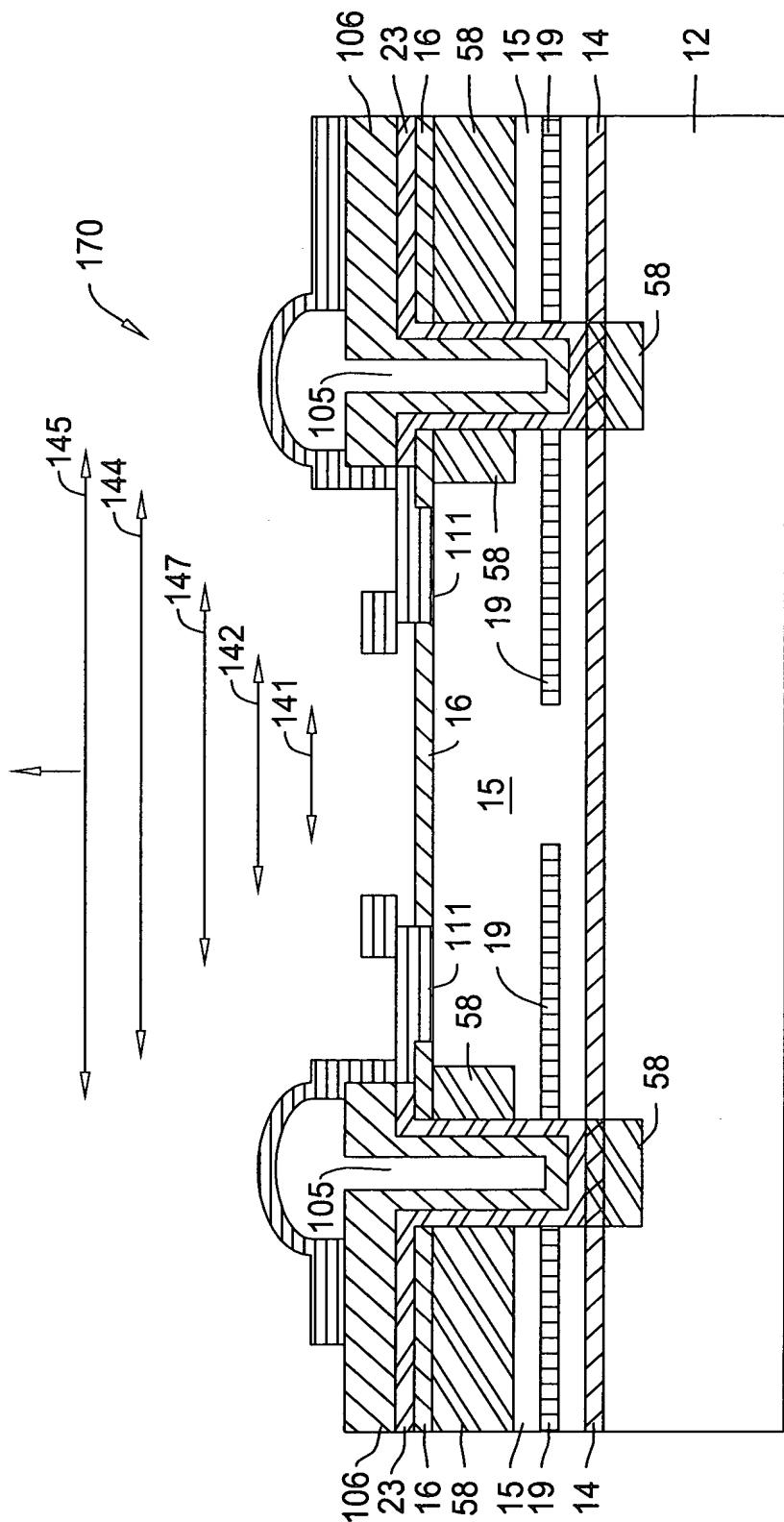


Figure 187

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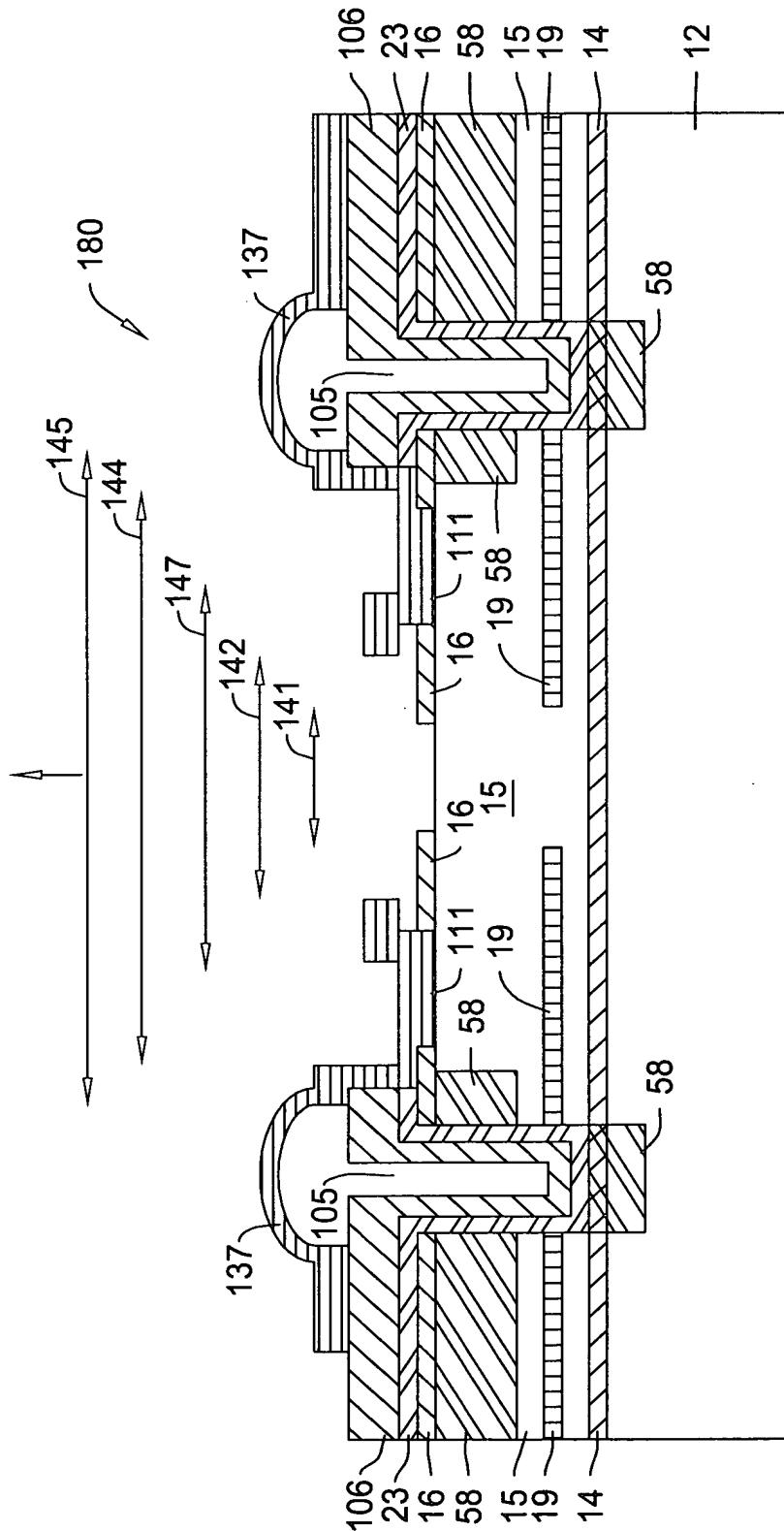


Figure 188

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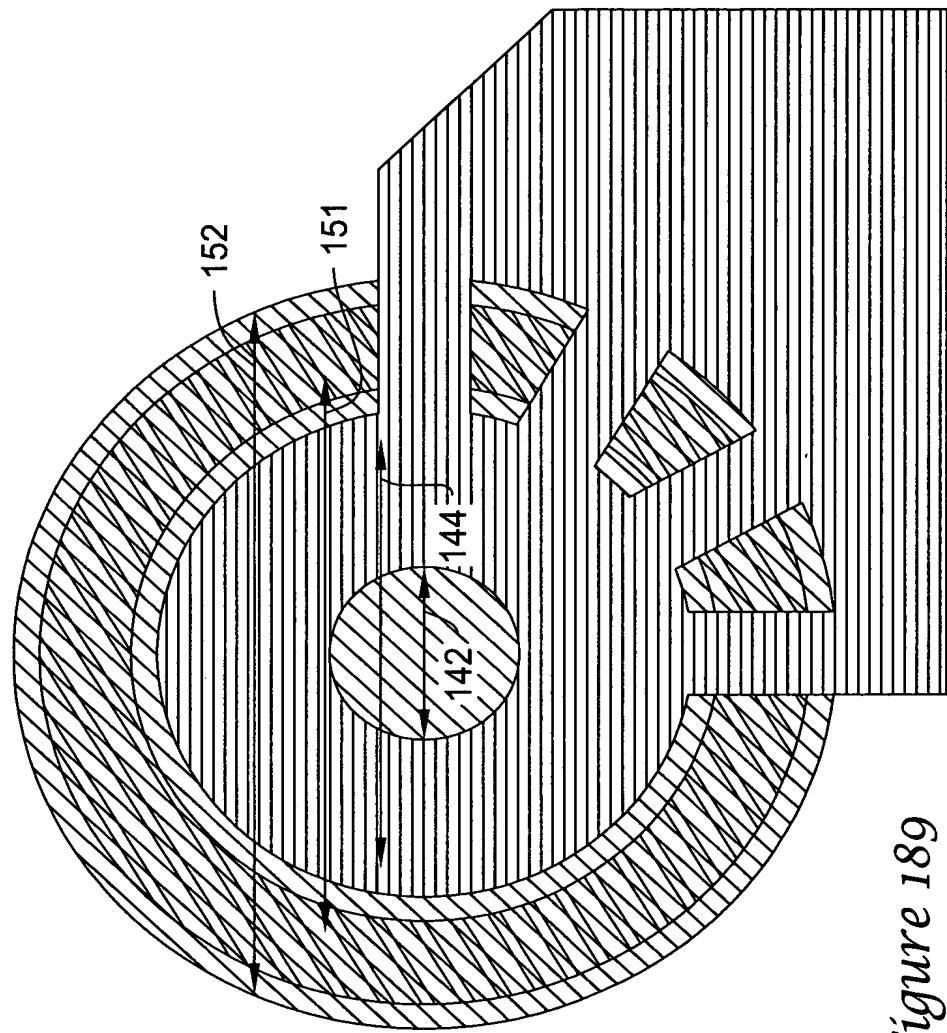


Figure 189

Standard Layout Geometry

<u>Feature</u>	<u>Variable</u>	<u>Dimension</u>	<u>Notes</u>
Oxide Aperture	A	Variable	VCSEL Aperture
Oxide Trench ID	B	A+20	10 um lateral oxidation
Thin Trench OD	-	B+5	2.5 um wide trenches
Wide Trench OD	D	B+8	4 um wide trenches
Isolation	-	B-4	Implant isolation
Aperture Via	-	B-4	Area without thick coating
Inner Metal ID	C	A+M	Metal aperture pullback variation
Inner Metal OD	-	B-2	Partially covers trench
Contact Via ID	-	C+3	optional? Extends below metal ID
Contact Via OD	-	B-6	Slightly less than aperture via
Air Bridge ID	-	B-2	For patternable trench fill-ins
Air Bridge OD	-	B+12	Matched to wide trenches
AB Aperture D	-	C+4	Larger than metal ID
Outer Metal ID	-	B+10	Partially covers wide trench
Outer Metal OD	-	B+18	4 um wide outer metal ring
SA Coplanar ID	-	D+8	Largest diameter: 42 um
SA Coplanar OD	-	180	Set to near edge of die
HOM(Metal) Filter	F	Variable	Circle/polygonal pattern in aperture area
HOM(Etch) Filter	F	Variable	Circle/polygonal pattern in aperture area

Oxide Aperture Variations (A): 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 um
 Metal Pullback (diameter) (M): 1, 3, 5 um
 Higher Order Mode Filter (diameter) (F): .5, 1, 2 um

Figure 190